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ABSTRACT

This manual was written to help college students become better students and more successful learners. The goals of the book are to raise awareness of, and interest in, the learning process generally; increase each student's awareness of her/himself as a learner; introduce specific strategies for more effective learning; suggest that each student controls many of the factors affecting his/her own successful academic performance; and stimulate interest in research on the part of professionals on strategies for effective learning. It begins with a strategy checklist for users to complete before reading the book which will help them assess some of their current learning strategies. In each of the 10 chapters there are many suggestions on approaches to learning, with self-awareness, monitoring, and personal control being recurrent themes throughout the book. Chapters focus on: (1) an introduction to successful learning; (2) organizing study time; (3) procrastination and other time troubles; (4) learning as a process; (5) learning from lectures; (6) learning from textbooks; (7) science problem solving; (8) writing essays; (9) preparing for examinations; and (10) writing examinations. A guide for teachers and counselors is appended. (NB)

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SUCCESSFUL LEARNING

Strategies for College and University Students

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Joan Fleet
Fiona Goodchild
Richard Zajchowski

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SUCCESSFUL LEARNING

STRATEGIES FOR COLLEGE AND UNIVERSITY STUDENTS

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A NOTE TO STUDENTS

Most students come to college or university as natural learners, that is they have never given much thought to how they learn — they just do it and do it quite well. You may be one such student and you may find that the college or university experience puts heavier demands on your learning than ever before. It is like moving up to the big leagues — everything is faster and more challenging. Natural ability can still carry you a long way but you will almost certainly do better if you get some good coaching. This book gives good coaching advice, with its focus on how to be a better student. Specifically this book is for you.

A NOTE TO TEACHERS AND COUNSELLORS

The idea that "Learning to Learn" is as important as learning subject content knowledge has steadily gained support in education. Researchers suggest that students' awareness of how they study, as well as the methods they choose to use, are both critical factors in successful learning. Although this book addresses the learning challenges facing college and university students, it is also appropriate to self directed learning at the secondary school level. We have had many discussions with teachers and counsellors at all levels within the school system about the learning strategies their students find useful, and there is no doubt that early strategy training in schools can establish valuable general attitudes and approaches to study.

THE GOALS OF THIS BOOK ARE TO:

- raise awareness of, and interest in, the learning process generally.
- increase each student's awareness of her/himself as a learner.
- introduce specific strategies for more effective learning.
- suggest that each student controls many of the factors affecting her/his own successful academic performance.
- stimulate interest in research on the part of professionals on strategies for effective learning.

We would like to acknowledge the contribution of all those students, faculty, and staff at **WESTERN** who have participated with us in a continuing joint learning venture. Without their interest and support this project would not have been possible. In particular we would like to thank our colleagues in **COUNSELLING AND CAREER DEVELOPMENT SERVICES** and Maria Lavdas of **DOCUMENT PREPARATION SERVICES** within the Department of Statistical and Actuarial Sciences for all her interest and expertise.

THE UNIVERSITY OF WESTERN ONTARIO 1987

STRATEGY CHECKLIST

Before you read this book it will be useful for you to assess some of your current learning strategies. Of course there are many others but these may give you a flavour of some you may already use or wish to use.

For each strategy either check **YES** (or — I usually/often do this) or check **NO** (or — I seldom / never do this).

A. IMMEDIATE STUDY ENVIRONMENT

Do you give attention to:	YES	NO
1. Selecting a study location relatively free of distractions?	_____	_____
2. Selecting a study location with adequate light and ventilation?	_____	_____
3. Having on hand useful materials such as paper, stapler, calculator, ruler, etc.?	_____	_____
4. Setting up a system to organize all notes and handouts for each course, so you can quickly locate essential materials such as old tests?	_____	_____
5. Planning your time so that you can give a reasonable amount of time to each course?	_____	_____

B. CAMPUS RESOURCES

Have you found:

1. A few colleagues with whom you can consult in each course you are taking?	_____	_____
2. When and what kind of assistance is available from your professor or tutorial leader?	_____	_____
3. The help centres for any of your courses?	_____	_____
4. Ways of preparing questions so that your times with a resource person are as useful as possible?	_____	_____
5. Any old exams that are available (e.g. in library) and the way to get them?	_____	_____
6. Any alternate textbooks and reference material which may be helpful when you have difficulties?	_____	_____
7. A method of keeping track of material and information on bulletin boards (e.g. sample tests,solutions, etc.)?	_____	_____
8. Where and what kind of assistance is available at the Counselling Centre, Health Services and other Student Services agencies?	_____	_____

C. PERSONAL HEALTH AND EFFECTIVENESS

Do you maintain:	YES	NO
1. A regular sleep pattern (7-9 hours/night)?	_____	_____
2. A daily balanced diet?	_____	_____
3. A reasonable amount of regular exercise?	_____	_____
Do you make time for:		
4. A few hours a week for your own enjoyment?	_____	_____
5. Getting away for a while either physically or mentally when problems or pressures arise?	_____	_____
6. Finding and talking to people to whom you can turn when you encounter difficulties?	_____	_____
7. Practising relaxation so that you can calm down if necessary?	_____	_____
8. Meeting other students who want to do well at school?	_____	_____
9. Focussing on the needs of others around you?	_____	_____

D. INTERNAL MENTAL PROCESSING

Do you consciously plan to:		
1. Reduce information by listening and reading for key ideas?	_____	_____
2. Keep track of the overall structure of the information by tracking themes using headings?	_____	_____
3. Repeat silently to yourself information that you are recording, so that you won't forget it before writing it down?	_____	_____
4. Identify possible test questions?	_____	_____
5. Self test by answering questions from memory, or by writing out key concepts from memory?	_____	_____
6. Use a variety of methods to develop a good memory of the content (such as using examples, reorganizing information into tables and diagrams, recitation, and self testing)?	_____	_____
7. Keep track of the stated aims and objectives of the course (e.g. by periodically reading the course outline and listening for messages from the professor)?	_____	_____
8. Review regularly to reduce forgetting?	_____	_____
Total	_____	_____

Add up the total checkmarks in the yes and no columns. If you have many more yes's than no's then you are on the right track. However if you are heavily into no's then you need to make some changes.

1. INTRODUCTION TO SUCCESSFUL LEARNING

- Welcome to the book
- The successful learner
- The good strategy user
- You as a good strategy user
- Important general strategies
- An example of a planful strategy — Goal setting
- Your immediate goals?
- Effective strategies and roadblocks

WELCOME TO THE BOOK

When you listen to people talking about a student's progress you will often hear terms such as 'bright', 'average' and 'poor'. As we learn more and more about the learning process, we begin to realize how complex learning is and we do not label the process in such simplistic terms. Learning involves very many factors in addition to natural abilities, such as home background and experiences, personality, formal schooling and motivation.

One component of successful performance that you control is the set of strategies that you apply to your studies and the resultant learning skills. Learning skills are the skills that, as a student, help you to handle the amount and array of information coming from different sources. They are the skills that you apply to listening, note taking, reading, reviewing, essay/assignment preparation and the management of study time in order to get the most out of these activities. By developing your learning skills you can increase your satisfaction in the role of student, knowing that you are putting forward the effort that you have determined is right for you.

One of the keys to personal control of your studying is awareness of yourself as a learner, knowing what you do and why you do it, and being on the alert for cues about changes you may need to make. Self awareness, monitoring and personal control are recurrent themes throughout this book.

In each of the chapters there are many suggestions on approaches to learning. Some of these suggestions will not be new to you. Students at colleges and universities have already acquired study patterns. Reading about learning strategies and skills will reinforce the usefulness of those you already have. However, it is hoped that there will also be new ideas that you will consider using.

No two students are ever exactly alike in their approach to studying. Successful strategies vary with the individual. Where suggestions are presented in this book they are presented as possible strategies. Select those that you think may be useful for you, but give those which you try time to work for you. Study habits are like any other habits. Once they are established they are difficult to dislodge. It takes a certain amount of effort to discard them if they are ineffective, and then to develop new habits. However, in the long run your newly acquired habits may save you a lot of time and frustration.

THE SUCCESSFUL LEARNER

Melanie is a first-year student who has just got back a test result in her introductory history course. She can't wait to get back to residence to share the great news with her roommate Karen that her very first test mark is an '**A**'.

Karen responds just as she expected with a wild yell and dances around the room, but then flops on the bed and looks at her. "You know", she says, "I'm not at all surprised that you got that '**A**' because:

1. _____

_____

_____

2. _____

_____

_____

3. _____

_____

_____

How do you think that Karen is explaining Melanie's success? Can you fill in some of the reasons why her mark was an '**A**'? Try to list at least three reasons before reading further.

THE GOOD STRATEGY USER

One explanation that modern educators might give for Melanie's '**A**' grade is that Melanie is a *good strategy user*[1]. This view contrasts with a more traditional view in education that would say that the main reasons for Melanie's '**A**' are that Melanie is bright, that is she has a high I.Q., and that she works hard. While those two factors may be important there is a lot of evidence to suggest that performance in school is often based on skills and knowledge that are learned. Success is not just a matter of innate ability and hours and hours of study.

Let us take a closer look at four components that contribute to good strategy use in the case of Melanie:

1. Background General Knowledge

Melanie took History every year in high school so this introductory course doesn't contain too many surprises. For example, the struggles between the French and the English settlers are not new to her, although never before has she gone into such detailed analysis of the Acadians.

She finds that her previous courses have provided an adequate background, so that she seldom feels overwhelmed or lost in class. In addition, she prepares for each class by reading ahead in the text. She knows that she gets a lot more out of a lecture when she has done her homework thoroughly.

2. Strategies

Reading the text ahead of class to acquire background knowledge is one specific strategy that works for Melanie. There are many other strategies that she uses in her overall approach, and they all contribute to her good performance. Some of the strategies set up her external learning environment, and others affect how she mentally processes the course content.

---

[1] The term "Good strategy user" was first used in, Pressley, M., J. G. Borkowski, and W. Scheider (1987). "Cognitive strategies: Good strategy users coordinate metacognition and knowledge". *Annals of Child Development*, Vol 4, 89–129. JAI Press Inc.

EXAMPLES OF STRATEGIES SETTING THE EXTERNAL LEARNING ENVIRONMENT:

1. She has a favourite quiet corner in the library and she always goes there to read the history text.
2. She sits where the lighting is just right so that her eyes do not get tired.
3. She sets a goal of reading ten pages before taking a short break.

EXAMPLES OF STRATEGIES THAT AFFECT MENTAL PROCESSING:

4. As she listens to the lecture she tries to listen for themes and to label them in her notes with headings.
5. She finds time to reread her lecture notes after class, checking to see that she understands her own notes.
6. If there is information that she doesn't understand, she works on that as soon as possible by checking the text, asking another student, or by checking with the professor.

3. Metacognition

Metacognition refers to what Melanie knows about her own learning, and her ability to control it. So not only does Melanie have strategies at her disposal, she also knows a lot about when and where to use them. For example, when she has to prepare for a test she may use extra memory devices because she knows that she will need to have more information at her fingertips for the test than she would need going to a regular lecture. She might use a mnemonic in the form of a rhyme or sentence to help her remember some critical facts. Strategies have to be appropriate to the task if they are to be effective and also efficient.

4. Personal Attitudes and Beliefs

Melanie enjoys being a student. Although she does find some things difficult she believes that she can do well if she both plans her activities and chooses appropriate strategies to meet important goals. She wants a balanced life on campus and she does not feel guilty taking time out for herself to play squash, knowing that she has planned for that. She is a great believer in both working and playing hard. She is prepared to give things her best shot and right now things are looking good.

YOU AS A GOOD STRATEGY USER

How do you rate yourself as a *good strategy user*? Choose one course that you are currently taking and think about the four components of the model:

NAME OF COURSE _____

1. Where did your background knowledge come from for that course and is it adequate for you to keep up with the course without too much difficulty?

_____

_____

2. List any strategies that you consciously use in that course.

_____

_____

_____

_____

3. Give one example of how you have adapted a strategy to meet the special demands of an exam.

_____

_____

_____

_____

4. How do you feel about yourself as a learner? What do you believe about your potential?

_____

_____

_____

If you wish to work at being a better strategy user, then a good place to begin is with the strategies themselves. At this point we could give you a whole list of strategies to try, tied to do's and don't 's — a prescription for the perfect student. However, we know that that would not work for many people. Most students tune out or turn off when presented with too many ideas for change.

A much better approach is for you to *identify for yourself a small number of strategies* that you wish to focus on and develop, and that you believe might work for you. Each chapter of this book introduces many strategies that successful students report work for them. It is important to remember that there are individual differences among students and not all strategies work for everyone. You are the decision maker so you choose which strategies to try.

Earlier we said that study habits are like any other habits. They are difficult to change. You may find that you have to *consciously remind yourself of the strategies you wish to try*. It will take time before you use a strategy automatically. Some students may need to go so far as writing the strategy on a $3'' \times 5''$ card and posting it where they cannot miss it, or devising some other similar system.

IMPORTANT GENERAL STRATEGIES

While this book introduces very many strategies, it also highlights the following five important general strategies that apply to any subject area, and they provide a theme throughout the book:

1. **Be strategic.** This is the whole message of this book. It suggests that students exercise considerable control over their own learning through their choice of approach to selected tasks. One of the major differences between high school, and college and university, is that in high school the emphasis is more on teaching while in post-secondary institutions it is more on learning.

   High school teachers are trained to understand how students learn and they plan lessons to reinforce memory of information, in addition to facilitating comprehension of new concepts. In post-secondary education the student must assume much of the responsibility of finding ways to reinforce and apply concepts presented in class.

2. **Be a reflective learner.** This suggests that you should try to think through things carefully. There are many examples of how to do this, but one is to periodically assess how you approach learning. A checklist of strategies is provided at the beginning of this book as an initial invitation to be more reflective. Other inventories will allow you to assess other areas.

3. **Be on the alert for cues.** There are many messages that the academic world gives to students. Some are very direct, for example, a professor may say, "on the test next week there will be questions only on this term's work", or "in this research essay all of your points must be substantiated with real evidence". These are only two of a possible host of cues that may be given for any course.

   Some of the cues may be more subtle and this problem may arise from the professor's expectations of the students. He/she may expect that the student already knows basic information necessary to doing well in the course. In fact that assumption may be incorrect. Students who are cue aware are much more likely to work efficiently and appropriately and be successful than students who are cue deaf. The main sources of cues are the professor, the course outline and other students.

4. **Monitor your progress.** How will you know if you have successfully learned what you intended to learn? You do not want the exam result to be your first feedback on the quality of your learning. In science subjects such as math, physics and chemistry it is common to solve sets of problems to check the level of your understanding. In many other disciplines though, you have to think of ways to check your own performance. Good students find interesting ways to do this evaluation.

5. **Be a planful learner.** There are many situations in which students need to be planful, such as planning their academic programs to ensure that there will not be major problems of lack of background or work overload. Students need to set the external learning environment by selecting when and where to work, and organizing any resources such as materials and help. Try to be in charge of the things you do by planning ahead. The chapter on time management goes into more detail about planning but this chapter stresses that for the planful learner it is important to set goals. Goals can be far in the future or relatively immediate. They can be vague or very specific.

AN EXAMPLE OF A PLANFUL STRATEGY — GOAL SETTING

There are many goals that students set for themselves. Any one student might have the following goals, to:

- live a happy life.
- get into medical school and become a heart surgeon.
- maintain a 'B' average this year.
- finish this essay before the due date next week.
- read the sociology chapter tonight.
- solve this math problem within 10 minutes.

As the examples show, goals can range all the way from very vague and/or in the future to specifically task related and very immediate. While it is necessary to set both future-oriented and present-oriented goals, it is the more immediate goals that can really make the difference to achievement and performance. There is no point in having heart surgery as your ultimate career goal if you can never achieve the immediate goal of sitting down to study. However, on the other hand if you are very organized and goal oriented on a day-to-day basis, but have absolutely no idea where your life is going, then you could end up in a blind alley. It is best to set a range of goals, both for the future and for the present.

YOUR IMMEDIATE GOALS?

What study tasks do you plan to complete today?

1. _____

2. _____

3. _____

4. _____

5. _____

EFFECTIVE STRATEGIES AND ROADBLOCKS

What things work for you as a student and what things work against you? Think about this in your next class and also in your personal study time, then use this sheet to collect some information.

	Effective Strategies for Learning	Roadblocks to Learning
Class Time	1. 2. 3.	1. 2. 3.
Study Time	1. 2. 3.	1. 2. 3.

2. ORGANIZING YOUR STUDY TIME

- Three levels of organization
- Working smarter instead of harder
- Survey of present habits
- Time management principles
- Planning a schedule — to balance study time with other activities
- Planning a schedule — for several courses
- Planning a schedule — in one course
- Recording and analysing time spent
- Time troubles

THREE LEVELS OF ORGANIZATION

There are three different ways in which a student has to organize time:

1. There has to be a balance of study time with all other activities such as jobs and recreation.

2. There is the challenge of allocating available study time among different courses taken by the student.

3. Within each course there is the problem of identifying what priority tasks should be given most time. This last issue is usually closely tied to the type of evaluation in the course.

This chapter will first of all look at some general principles of time management which are common to these three issues, and then go on to identify techniques which can be applied towards each level of scheduling.

WORKING SMARTER INSTEAD OF HARDER

The prevalent theme of much of the literature on this topic emphasizes how important it is to find intelligent ways of time planning. However since this often involves making some very tough decisions, the distinction of smarter vs harder seems a bit artificial. However, there are several pointers which underscore this theme:

1. Spending many hours studying does not necessarily show as increased payoff with marks. Studies have shown that an optimum relationship is reached between time and marks, and beyond that there is very little improvement.

2. Parkinson's Law suggests that tasks fill the time allotted to them. Have you ever noticed this? Unless you set time limits then even small tasks can take all the time there is.

3. The Pareto principle claims that 80% of results comes from 20% of the investment. Transferring this to studying reinforces the challenge — what is the important 20% of studying in any course that will result in 80% of the grade?

4. Students who allow themselves a varied schedule, including time for their own interests, are more alert and ready to study in their scheduled study time. That is, a balance of work and play helps concentration.

5. Living from one assignment to the next test and vice versa can be very inefficient. Dwight Eisenhower spoke of the disadvantages of this 'fire fighting' approach when he claimed "The more immediate, the less urgent"

The main advantage of planning ahead is that, although you may not produce a perfect schedule each week, you will get into the habit of anticipating what is coming up and be more aware of your planning. You may or may not have an extensive way of writing this down but having a plan that you monitor helps to reconcile the time available with the tasks at hand. Otherwise, as any last minute crammer will tell you, things can get very hit and miss.

As you move from awareness of how your time can be better spent to budgeting for certain key activities, you will get better at evaluating your own efforts and notice what your own strengths and weaknesses may be. You will become clearer on your preferred time to study, which locations are best for specific tasks, and how to estimate the amount of time a task may take.

All of us have preferences which interfere with our time planning. Some of us like a feeling of space. Others enjoy a certain amount of pressure. Plan according to your taste, with an eye to 'creative procrastination'. This is the positive type of procrastination, where a task is left until exactly the right time, resulting in enough pressure to motivate the most efficient and effective completion of the task.

The objective of this chapter is not to convert you into a rigid clock watcher, but to suggest ways of planning to get your studying done so that you can get better results and enjoy your leisure time without feeling guilty.

SURVEY OF PRESENT HABITS

For each of the following statements, check the response that best fits your current time management style:

1. Rarely or never 2. Sometimes 3. Often or always

		1.	2.	3.
1.	I usually do the most important tasks of my day first.			
2.	I use listmaking to help organize things I have to do.			
3.	I like to get started in good time.			
4.	I set my own deadline for assignments.			
5.	I use rewards for accomplishing my goals.			
6.	I make use of small blocks of time.			
7.	I make a weekly plan to meet my goals.			
8.	I know what are my time 'wasters'.			
9.	I keep close track of deadlines coming up.			
10.	I like to get started well ahead on assignments.			
11.	I have a schedule for each day.			
12.	I plan my free time to fit with my work schedule.			

All of the above statements are strategies that good students report work for them. Read through them again and make a decision on two strategies that you would like to try on a consistent basis.

Strategy 1.

_____

Strategy 2.

_____

TIME MANAGEMENT PRINCIPLES

Here are some points to guide your day to day decision making. See if you recognize any of your own patterns in these time management principles.

1. Use Small Blocks of Time

If you have an hour between classes or half an hour between meetings, you can review class notes, balance a cheque book, plan the outline of an assignment, pick up supplies at the book store or do a computer search for a term paper, etc.

2. Subdivide One Large Task Into Several Smaller Ones

A computer search could be the first step in a major assignment. Do not be tempted to put off such tasks until you have plenty of free time. That kind of time never appears and a hurried, last minute effort might result. The 'Swiss cheese' approach of making holes in a large task can be an effective strategy. You will appreciate the effort when you do sit down to put the assignment all together.

3. Do Things Now

You plan to spend the evening working but before you begin you make a cup of coffee – clear off the desk top – change into a track suit – flick through a magazine – sound familiar? When you finally get down to study you will be too tired to think. You may experience a sense of relief but its doubtful that your studying will be efficient.

4. Work to Completion of a Goal

How often are you distracted from a task before it is complete? Do you get the urge to call a friend on the telephone, switch on the stereo, or lie back and take a nap? It can take a lot of willpower to stick with it — but if you have a reward planned, you will have a lot more incentive to finish the task.

5. Recognize Your Limits

Planning more things doesn't always get them done. In fact, a packed schedule can be just one more thing to worry about. Everyone needs turn-about time! If your planning does not leave you with a free minute then ask yourself, "why?". What is the payoff for such a harried schedule?

PLANNING A SCHEDULE – TO BALANCE STUDY TIME WITH OTHER ACTIVITIES

The following steps map out a way of planning a realistic schedule. The *paddle* mnemonic may help to remind you that this is a tool to help you make progress while still being sensitive to changing demands and conditions. It is not something that can work by itself, nor can it control you. Try it and get your feet wet.

1. **P** Priority setting
2. **A** Assessment
3. **D** Decision making
4. **D** Day to day records
5. **L** Leaving unimportant tasks
6. **E** Evaluation

1. Priority Setting

Being able to recognize the activities that lead to attainment of major goals can help you to reconcile the difficult choices that you may have to make. Think about whether or not your present use of time reflects your priorities.

Can you state your major goals for this academic year?

Major academic goal_____

_____

Major non-academic goal_____

_____

Each of the goals that you have stated will require directed effort. Can you list three activities that are important to the achievement of your goals?

	Academic Goal	Non-academic Goal
1.		
2.		
3.		

2. Assessment

Looking ahead to the demands of the term can alert you to potentially busy periods.

a. On a term calendar mark *significant assignment dates* to make clear what will be the pattern of work

b. Think about the *fixed commitments* that you have each week, such as classes, labs, travelling, volunteer work and so on. Mark these on the blank weekly timetable on page 22. Once these are marked in, make enough photocopies for one per week. Then each week you can mark on extra activities that are specific to that week.

c. How many hours can you identify as *potential study hours*? Look at the sample timetable on page 23. This student's schedule allows for 22 hours spent in class and 24 hours for personal studying. This student expects to be doing most of the work during the week, but has flexibility in the time used on the weekends — a less reliable time for studying for most people. Don't fall into the trap of using daytime hours for socialising and non-academic chores, and late evenings for study. That can be a poor pattern of study.

3. Decision Making

Now you can select the study time you think will suit you. This may often involve consultation with family or friends, especially a roommate, if you want them to give you some help or some peace and quiet.

a. Do not plan activities into every hour. You need some flexibility or 'contingency' time for those emergencies which cannot be anticipated (transport problems, unexpected guests etc.).

b. Try to match class preparation time and lecture review time suitably near to class attendance. Use the timetable on page 22 to plan some study time for this week.

4. Day to Day Records

Having planned activities for the week, it is also a good strategy to list activities you wish to accomplish in any one day. Two possible formats for daily listing are on pages 24 and 25. The first of these has space for a daily comment. Monitoring progress in this way can help you detect problems, such as overplanning. Most of us start by underestimating the time needed, since that allows us to imagine that we can get more done.

5. Leaving Unimportant Tasks

Students have devised many ingenious ways to save attending to low priority chores. One mature student delegated answering the phone to his 8 year old daughter, while another shared shopping with her roommate so that she had to go only once a month. Many chores that cannot be avoided can be delayed until late evening when they are not impinging on good thinking time. This step also involves saying 'no' to activities which do not fit into your schedule. How creative can you be?

6. Evaluation

"The best laid schemes o' mice an' men
gang aft agley"

To a Mouse — by Robert Burns

With any innovation, it is useful to step back and consider how it is working and what gains you are making. If it is a success, this will give you the energy to keep working. If you are not pleased with the results you may need to ask for help from a counsellor or professor, especially if you wish to investigate the results of a test.

PLANNING A SCHEDULE — FOR SEVERAL COURSES

Being a good time manager for all of your courses requires careful assessment of what academic studying entails. Here are some sorting factors to consider:

1. Can you plan your study time in *40-50 minute time blocks* with a short 5-10 minute break every hour? This can help to keep up your level of concentration as you study.
2. Can you spread out the amount of work to be covered, in a week in any one course, into daily chunks? This is called *distributed learning* and research indicates that this is more effective than doing it all at once the night before class (massed learning). Giving yourself time to sort through ideas and making comparisons and connections is very important for long- term retention.
3. Can you establish a *clear objective* for each study period? If you can choose a certain section to read, or set of notes to review, or problems to solve, you will be more likely to accomplish that task in reasonable time.

4. What does each course require in terms of ***preparatory reading*** for class? Is it helpful to read the material carefully, or to skim it before the lecture and read it in detail later? Arrange this reading time fairly close to class so that the information is fresh when you start to take notes.
5. Do you set aside 15-20 minutes to ***review class notes*** the same day as class, or when you read the course materials? More information on how to do this follows in chapter 5: LEARNING FROM LECTURES.
6. Can you organize some way to check the quality of your study, perhaps by ***self-testing*** before leaving a particular topic or task. You may be able to use a study guide for this if you were reading a text, or test your knowledge by making a short, point-form summary.

PLANNING A SCHEDULE — FOR ONE COURSE

The context in which you study will affect how to plan for study time in one course. Professors vary in their approach to their subject, so that a geography course on one campus will differ from one at another. However, all professors will give cues as to what they think is important, as well as basic information about assignments and evaluation.

All of this should be filtered through your existing knowledge of a discipline when you come to make decisions. You will have experienced, for example, that in math constant practice of problems pays off, whereas in social science courses some 'delayed effect' can be helpful before clarifying import nt concepts which you intend to memorize.

It is important, then, to start thinking in terms of priority tasks, rather than in terms of time spent in any one course. So rather than asking, "how many hours a week should I spend on my geography course?", try to ask the following:

"What tasks are most important in this course?"

"Which tasks are useful but not very necessary?"

"Which tasks should be completed only if I have time to spare?"

List below the priority weekly tasks for one of your courses.

COURSE_____

PRIORITY TASKS_____

_____

_____

RECORDING AND ANALYSING TIME SPENT

If you are having difficulty altering a pattern of time use to suit your needs, try monitoring your time use for three week days. Use the following chart to record your activities, hour by hour. Pay particular attention to out of class study time. Use the information recorded to find out how much time you are spending on different activities by completing the tables on the next page.

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
7:30					
8:30					
9:30					
10:30					
11:30					
12:30					
1:30					
2:30					
3:30					
4:30					
5:30					
6:30					
7:30					
8:30					
9:30					
10:30					
11:30					

ACTIVITIES	HOURS			
	DAY 1	DAY2	DAY3	TOTAL
CLASS				
STUDY				
TRAVEL				
EXCERCISE				
MEALS & CHORES				
LEISURE				
SLEEP				
TOTAL				

1. Fill in the total STUDY time for each course. List the tasks that were done.

COURSE	TIME	TASKS
1.		
2.		
3.		
4.		
5.		

2. Can you see which times of day are good for

   - serious concentration?_____
   - demanding study tasks?_____

3. Can you detect a time which is not productive for studying?

_____

_____

WEEKLY SCHEDULE

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
7:30							
8:30							
9:30							
10:30							
11:30							
12:30							
1:30							
2:30							
3:30							
4:30							
5:30							
6:30							
7:30							
8:30							
9:30							
10:30							
11:30							

SAMPLE WEEKLY SCHEDULE

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
7:30							
8:30		Biology Lab	SLEEP IN	Math Tutorial	Geog Lab		
9:30			Chem Lab				
10:30							
11:30	SWIM	Geography 020		Geography 020	LUNCH		
12:30	Math 23	LUNCH	Math 23	LUNCH	Math 23		
1:30	LUNCH	Physics 020	LUNCH	Physics 020			
2:30	Chem 020		Chem 020	Physics Lab			
3:30	Biology 020		SQUASH				
4:30		SWIM	SWIM		SWIM		
5:30	DINNER	DINNER	DINNER	DINNER	DINNER		
6:30							
7:30				SQUASH			
8:30				CLUB			
9:30							
10:30							
11:30							

Potential Study Periods

Flexible Study Periods

STUDY PLAN FOR WEEK BEGINNING SUNDAY _____

	SAT./SUN.	MON.	TUES.	WED.	THURS.	FRI.
MORNING						
AFTERNOON						
EVENING						
DAILY COMMENT (Outstanding items)						

This Week's study tasks **Date**_____

Course	work to be done (by what date?)	your target date?	plan of attack

TIME TROUBLES

1. Mike has been spending more and more of his time talking with his friends rather than preparing for his classes. He's frequently so involved he forgets to go to lectures. He often says he has problems controlling his time. *What suggestions do you have for working on his problem?*

2. Joan, a first-year student, is carrying six subjects. She feels a great amount of pressure because her family has sacrificed for her education. She's having difficulty managing her time plus she's been offered a part-time job. *What comments would you make on her situation?*

3. Adrienne has come to university to meet new people and expand her horizons. Her studies are important to her but she also wants to have an active social life. This is the second week of class and she hasn't done any studying so far. *If you were to meet her, what advice and help would you offer?*

4. Bill would like to be on student council. He also wants to get into medical school and is in a demanding first year science programme. *How can he accommodate these two goals?*

3. PROCRASTINATION AND OTHER TIME TROUBLES

- The stress of studying
- Reasons for procrastination
- The vicious circle
- Worry thoughts
- Remedies for procrastination
- Concentration
- Your concentration profile

THE STRESS OF STUDYING

The previous chapter advocated planning realistically for upcoming assignments and tests. While some students find this helps them to get organized, many others report that they cannot follow-up on their good intentions, even with a plan. Others again confess to giving up on planning completely and just trying to keep up with one deadline after another. They are encountering some of the stress of being students who are in doubt about their chances of success. Here are a few typical comments:

> "I really didn't choose my elective very well — I just don't think I have enough background to understand it."

> "I never feel caught up in this course — it moves along so quickly."

> "I'm never sure how I'll do in multiple choice tests — even after I've finished them."

These students are responding to the change in expectations and workload of moving to a post secondary setting. Though many enjoy this change as stimulating, for some students who have relied on guidance about what to do and how they are doing, these new challenges seem unnerving. Students in this group often report that they find themselves procrastinating on course assignments and being frustrated at not getting things accomplished. These problems can lead to more worry and also to common concentration problems.

REASONS FOR PROCRASTINATION

When we asked a group of students about their reasons for procrastinating they came up with several suggestions:

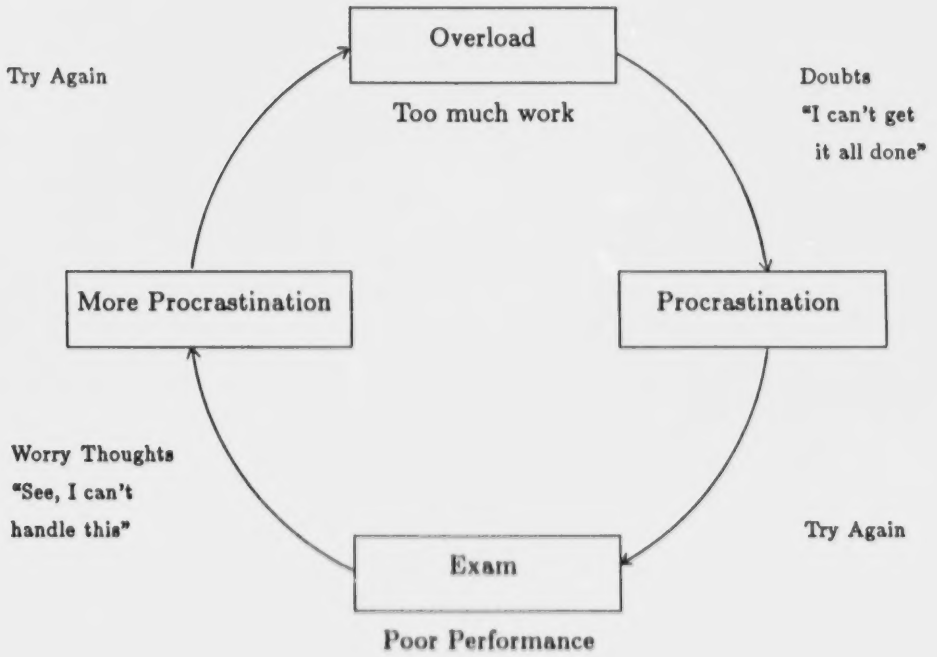
1. **Inertia**
   This prevents some people being able to change from one activity to another. It takes less energy to keep on doing the same thing — especially if it is having a cup of coffee or watching T.V.
2. **Loose Ends**
   Some people feel it is important to finish one thing completely before going on to another.
3. **Having No Goal**
   With many things to do — all claiming equal priority, it is hard to decide where to begin. Who needs a degree anyway?
4. **Low Appeal**
   Other activities seem to have more pay-off than studying, especially in the short term, e.g. sports, socializing, going to the movies.
5. **Loneliness**
   Studying is isolating. Isn't it possible to study in the kitchen or student lounge where you can have some company?
6. **Guilt**
   What is being neglected for study? Everyone else needs your time and attention, your friends, family, church, ... the dog.
7. **Fear of Failure**
   Last time you tried to read this chapter it didn't go very well ... and you can remember not being able to get these math problems ... now you are confused about what to expect.
8. **Fear of Success**
   What will happen if you do well? Your expectations will go up. Other people might have them too ... you might not get so much help ...
9. **Doubts About Ability**
   If you really put in a lot of effort and then did not do very well, you might have to question your ability — your excuse for not doing so well would be gone.

THE VICIOUS CIRCLE

Just as students are experts at analyzing the reasons for procrastination, they can be adept at finding alternative activities that seem to be worthwhile. Spending time at the gym (its good to be fit), organizing a club (great experience for my resumé), or volunteering to help at the hospital (valuable career exploration) can all be substitutes for studying.

When this is happening most students are aware of their procrastination but they cannot seem to break out of a vicious circle of messages which are self-critical and discouraging. Considerable worry may result from attempts to control this problem.

Many of us have valid doubts about how well we are performing but in the vicious circle these become so overwhelming that they prevent us from getting down to study and result in poor concentration. Then the distractions of social and recreational opportunities offer temporary relief by 'putting things off'. Even while avoiding the issue, however, we are still feeling guilty about what is being neglected.



WORRY THOUGHTS

Worry thoughts can not only be very distracting but, more significantly, can lead to physical symptoms of stress. Tension headaches, sleeplessness and stomach upsets are a few such symptoms. Once there is such a physical response it can be much more difficult to rewrite that 'internal script'. A spontaneous reaction is to take time out and rest but this is, at best, only a temporary solution. The basic issue of how to put positive energy into studying will still remain.

It is therefore important to be able to monitor both your symptoms of stress and the kind of worry thoughts to which you attend. If you see study tasks as threats to which you respond with fear or anxiety, you will have a different physical response to that of a student who perceives the situation as a challenge which can be a trigger for excitement rather than fear. You may have to write down some of your worry thoughts in order to assess what assumptions you are making about your approach to studying.

One exercise which can be useful is to compare your mental messages about studying with your thoughts about something you really enjoy such as playing a game of tennis. The chances are that when enjoying the activity, you do not find mistakes such a problem, you can keep your mind on the here and now, and you are not too concerned with the results. On the other hand, students under stress about study tasks become upset about mistakes, spend time wondering about what will happen *if* they don't do well and dwell on a negative outcome, such as low marks.

Since such negative thoughts do seem to have an effect on behaviour, it is often helpful to rehearse statements which are more positive and may keep your attention in the present — e.g. "what's involved here?" or "what's the next step?" Getting help from a counsellor in order to monitor your thought process could be very valuable, for this has been found to be a way of improving your ability to cope with the stress of study. More about anxiety is explained in chapter 11: EXAM WRITING.

There are certainly times when all of us become caught in the vicious circle and have to consciously work to keep moving. With this in mind the following ideas, gleaned from students, may provide a useful starting point.

REMEDIES FOR PROCRASTINATION

1. Set up a reward for finishing something — this can counteract a lack of initiative.
2. Select a task to start with which is not too demanding — in your estimation.
3. Subdivide a bigger task into several chunks (e.g. 15 minute items) — this can reduce difficulty.
4. Suspend your criticism of how well you are doing in order to get through it at least once.
5. Co-operate with a friend in sharing an assignment by working in tandem — this can reduce the isolation.
6. Substitute the mental message "I should" with "I'd like to".
7. Lower your expectations and accept that a realistic goal is 'doing your best within a time limit'.
8. Assess how you might improve your concentration.

CONCENTRATION

Concentration is being able to direct one's attention, or giving all one's attention to one thing. How can some students sit down and concentrate fully, while others find themselves daydreaming or attending to various diffuse thoughts or disturbances around them?

Achieving better concentration is very important to making your study time most effective. Two or three hours of intense effort are worth a day of interrupted or haphazard study.

This chapter will present three important components of concentration and suggest strategies that you can adopt which will help to bring your attention to focus more readily on one task. These are:

Commitment

Knowing why (or, convincing yourself that) the study task at hand is important.

Internal Distractions

Using strategies to deal with wandering thoughts.

External Distractions

Organizing a place and time for studying that helps you to shut out things going on around you.

Commitment

Your level of concentration, while studying, is closely linked to your interest in the subject matter of a course, the way in which it is taught, the setting, and whether or not it is an optional or mandatory course choice. Strategies that can help to maintain a high level of commitment to a course are:

1. ***Find out as much as you can about a course before choosing to take it.*** Read the calendar description, talk to the professor, and to students who have taken the course, if possible. Check that your background is adequate for you to handle the course without major problems, and that you feel confident about the work load.
2. ***Assess the contribution that the course will*** make to your general knowledge base, your degree program and to possible career choices. Your commitment will be stronger if you have a clear idea of the benefits of the course.
3. ***Know the rules and regulations governing the course.*** If you have a clear idea of whether or not you can withdraw from a course if things go poorly, you will not feel so trapped about giving it reasonable effort.
4. If you anticipate any problems, you may wish to ***be part of a study group.*** In difficult courses it is not uncommon for students to share ideas about the course.
5. ***Try to work regularly at the course.*** It is difficult to maintain a high level of commitment when you fall behind and get overwhelmed by the amount of work ahead of you.

Can you identify your commitment to the courses you are currently taking? For each course try to give at least one reason for your choice.

	COURSE	REASON FOR TAKING COURSE
1.		
2.		
3.		
4.		
5.		

Internal Distractions

You can be distracted from studying if you are physically uncomfortable. You may be too cold or too hot, hungry or too full. The light level may be straining your eyes, or the position in which you are studying may become uncomfortable. Try to organize these things at the beginning of the study period. Your determination to pursue your studying in an active way can be gauged by whether or not you can use some of the following strategies to aid concentration:

1. *Record a pencil checkmark when your mind wanders from the topic at hand.* Monitoring the number of check marks will give you a way of checking if your attention span is improving.

2. *Try 'thought stopping' when you find yourself daydreaming.* Some reflection — especially if some personal emergencies are interfering — can be productive but if this happens too often ... say "Stop" mentally and then redirect your attention back to the work you are doing.

3. *Define a specific objective for a fairly short time span.* This can avoid the vagueness of an approach like "I'll do as much as I can on Tuesday evening". Saying "I'm going to read 5 pages of sociology and make up three questions on them" can give you a realistic goal to work toward.

4. *Set up a method of self-testing on the work you have covered in any hour.* Knowing that you have to complete this will keep your focus on the task. Using it will increase your ability to recall material.

5. *Use a problem solving technique to deal with a persistently disturbing thought* e.g. "should I work part-time or not?".

   a) Move away from where you are studying.
   b) Decide what is the concern.
   c) Look at why it is difficult to make the choice.
   d) List the pros and cons of the possible solutions.
   e) Consider whether you can decide on your own or if you need to consult with others.
   f) Plan when and how you will deal with it.
   g) Note this down and return to your studying.

External Distractions

Although finding a time and place for studying with few distractions will not guarantee concentration, it will make it easier for you to control your attention. Most of us can attend to only one main train of thought at a time. In your study experience, how difficult to ignore are these following distractions?

		Easy to Ignore	More Difficult to Ignore	Impossible to Ignore
1.	Hearing a conversation near your desk			
2.	Sensing doors opening and shutting			
3.	Hearing the radio or T.V. in the same room.			
4.	Noticing traffic outside the room.			
5.	Hearing specific loud noises eg. bells, sirens.			
6.	Being interrupted by someone.			

Students will give different answers to this list, though few can ignore the last item. What things we notice depend on our interest in studying and conscious effort to shut things out. Students who regularly work well in a particular setting become conditioned to expecting to concentrate in that place. This effect may also hold true for working at certain times of the day. A place where you are more likely to concentrate may involve:

a) Clearing your desk of souvenirs, pictures, etc. so that you cannot be distracted by them.
b) Arranging your desk to face a blank wall - your studying must be more interesting than that!
c) Knowing which libraries suit you — experiment until you find one in which you like to study.
d) Having the right level of noise in the background. Some students claim that they work better with a level of 'white noise'; others like silence. Try out different situations.

YOUR CONCENTRATION PROFILE

1. Assume that you want to give your full concentration to a task. In the space below describe the ideal situation that will allow you complete concentration.

2. We all have problems sometime or another with concentrating on a task. Imagine you are reading a chapter in a chemistry or sociology text. After 20 minutes you feel like giving up because you realize that you are not getting anything out of it. List some possible reasons for this.

4. LEARNING AS A PROCESS

- The Learning Process
- Memory Systems
- Monitoring Comprehension
- A Selection Framework
- Management by objective and quality control

THE LEARNING PROCESS

The aim of this chapter is to highlight some current theories and ideas about the learning process, so that you can understand better why learning strategies work or do not work in a variety of settings for different individuals.

As you read, keep in mind that ***it is you that you are reading about***. The theory will only be of use to you if you can personalize it to your own situation. Keep asking the following questions: "How does the theory reflect my own learning?" and "What changes do I need to make as a result of my reading this?".

Also, remember that this is theory and that you can question whether or not it seems to fit with your own experience. Learning after all is covert, an internal operation. Any one learner is intimately aware only of her/his own experience. However, current educational theories can contribute much to our knowledge and understanding of ourselves as learners.

Learning process research focuses on the way in which learning takes place, rather than simply on the products of learning. The products are much more visible and easier to evaluate. They are the test performance, the essay, the solved science problem. In fact they are the sum total of the knowledge that a student is able to display for others. Here though our interest is on the processes that lead to those end products.

It is important to note that mental processes occur both automatically and consciously. Many components of behaviour, when doing common tasks such as driving a car or kicking a soccer ball, become automatised through constant use. It is also true that we automatically mentally respond to many learning situations. It is likely that a number of your study habits require little conscious thought, and consequently may be difficult to change. As you read about the learning process, be thinking about how you can have more control of that process through strategies that you consciously choose to apply.

MEMORY SYSTEMS

Educators distinguish three memory systems operating together but with distinct functions and characteristics. They are described very briefly here, focussing on the major implications for a learner who wishes to have more personal control over the learning process. They are:

1. Sensory memory
2. Short-term memory
3. Long-term memory

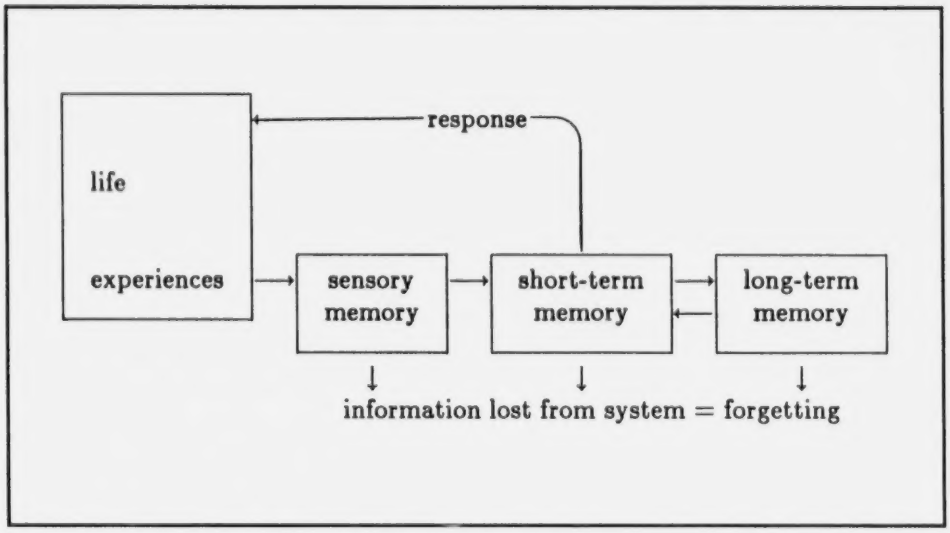


Fig. 4.1 A Theoretical View of Memory

1. Sensory Memory

Our senses, such as sight, hearing, touch, smell, etc., register information from the environment and make it available for further processing in short-term memory. An important feature of the sensory memory system is that information registers only for a very brief period of time. It is then either lost from the system as forgetting or is a conscious thought in short-term memory.

How is this significant for the learner? Well, one might view sensory memory as a critical gateway through which information must pass in order to be available to further memory systems. If information cannot get into and through sensory memory then it is unavailable to the learner. For information to pass to short-term memory the learner must give it attention by concentrating on it.

We do not register everything. For example, when we sit at a desk we do not usually notice the pressure of our feet on the floor, or hear constant noise such as a fan, or traffic outside. If we did register everything from our immediate environment life would be very confusing. A good student has the ability to focus on critical stimuli. Much of what sensory memory registers is either information that has tremendous impact, or that is tied to goals that we set. Your learning goals have a profound effect on the information that you attend to.

2. Short-term Memory

This is a very active, immediate memory system. It is sometimes referred to as working memory because it is here that a student works to understand and respond to incoming stimuli, whether they come from the external environment or from knowledge retrieved from long-term storage.

Two characteristics of short-term memory are critical to the learner. The first is that information is soon lost from this memory unless it is rehearsed. Most will identify with having to repeat a telephone number if there is a pause between looking up that number and then dialing it. An academic example is of being in a lecture and having to cope with the simultaneous activities of listening to new information while recording previous thoughts. Unless some internal dialogue occurs which allows for repetition of a critical thought, then that information may be forgotten and unavailable for the record.

Short-term memory also has limited capacity. Although several ideas can be juggled at once, the addition of too many new ideas can result in the loss of some of them. Students need to be very aware of situations that can lead to overload. A good example is when a student reads many pages of text without employing conscious strategies leading to long-term storage of the information. As each new sentence is processed, the load on short-term memory increases and soon the student is in a situation where as much forgetting is taking place as learning.

3. Long-term Memory

Perfect long-term memory is the dream of many students, who often have tales to tell about all the people they know with fantastic memories. There are the roomates who never study and yet go into tests and always get '**A**'s. While it is certainly true that some people do appear to be able to remember without too much effort, it is also true that many many people, including very good students, have to employ conscious strategies for remembering important information.

How do good students remember key information? We can gain some insight into this problem from research findings and from self-report from successful learners themselves. Many of these findings can be summarized through the following four important general strategies for effective knowledge storage and retrieval:

1. Select (reduce)
2. Organize
3. Associate
4. Rehearse (review)

1. SELECT (Reduce)

Many students report using strategies to reduce the total amount of information to its key elements or main ideas. For a physics student this might involve separating general formulae from those applicable only in specific instances, and then working through selected problems. A sociology student might generate a glossary of terms and organize them under main approaches within the discipline. A business student might list a logical sequence of steps in the decision making process within a company. In other words, the task of reducing information must be appropriate to both the subject matter and to the student's goals for the information.

2. ORGANIZE

Can you imagine a government office without a filing system? As each new memo and document comes in it is tossed on a pile in the corner. You can picture the chaos when anyone needs to retrieve an important item! Thankfully this is not an analogy of the brain. There is a lot of evidence to suggest that information is stored in the form of schema or organized categories, similar to a sophisticated filing system.

For example, when you read the word 'canary', what are some of the immediate images that you have? In what kind of schema is your canary? Some students report — all things yellow — or birds — or pets. Schema will vary considerably among individual students and there is no question that the personal system that you have developed affects your retrieval abilities. Some personal systems are better than others and you will wish to work on producing a good system.

Thus an important goal for a student is to organize information that is to be learned. The probability of information being remembered will be much higher if it is logically organized into units labelled with headings, and using numbers, tables and diagrams, and also indicating relationships with symbols, arrows etc.

3. *ASSOCIATE*

Very closely allied with organization, is the way in which new knowledge is associated with existing knowledge. New knowledge is like a ship that needs anchoring in harbour so that it will stay in place. The more associations you make between old and new, the better anchored the new information will be.

Some associations will be ***real associations*** from your own experience. In sociology for example, an institution such as 'the family' will be measured against your real family, and visual images of family members, relationships, and events will play a key role in your memory of the concepts.

Not all new information can be matched with real experience however and you may need to make ***arbitrary associations*** to memorize information. An example is the use of mnemonics (memory devices). Words or phrases or visual imagery can be used in this way. *Sohcahtoa* is one word capturing some important trigonometrical principles: sine is opposite over hypotenuse; cosine is adjacent over — and so on. Most students have had experience with mnemonics, even if only for remembering the number of days in a month.

4. *REHEARSE* (Review)

Rehearsal is a powerful form of review. It involves using knowledge in the same way that you will be expected to use it in key situations such as test taking. For example, if you have to write essays for a history test then it is necessary to write as you learn the information. In such a situation many students make the mistake of reading and more reading. When it comes to the exam they find themselves having to recall and write for the first time. By self testing through writing from memory you get important feedback on what you do and do not know, as well as practising communication skills.

In multiple choice exams there is heavy emphasis on concepts clearly defined. If possible, practice on sample test questions from old tests or from a study guide if one is available. If sample questions are unavailable, generate short answer questions and answer them the following day. It is really important to devise ways to use and test information. You do not want the test to be the first time that you have had to recall information from memory.

In problem solving courses, such as math and physics, much more learning takes place from actively solving problems than from simply reading through concepts.

MONITORING COMPREHENSION

One fact that is indisputable is that *good understanding is the main underpinning of good memory*. How many times have you heard someone say — "If you don't understand — ask"? That is good advice. New concepts can be very difficult and often students will be working with partial understandings, hoping that things fall into place.

A good student is usually aware of poor understanding, and researchers report that students experience discomfort or disequilibrium at such times. Ideally any student should track things that are not clear and make an effort to do something about it, whether that involves going to an external resource such as the professor or employing internal strategies of thinking-through-the-concept using notes, text, set problems etc.

It is usually when students need to use the information, by applying it to a test or assignment, that they really monitor how well or how poorly they understand the material. Can you explain the strategies you use to monitor the level of your understanding? This is an issue that deserves careful attention.

A SELECTION FRAMEWORK

One strategy that appears to be effective, for many students, for text reading and for lectures, and that can lead to better understanding of information, is that of using a *selection framework*. It combines the important principles of selection and organization and can aid identification and labelling of information.

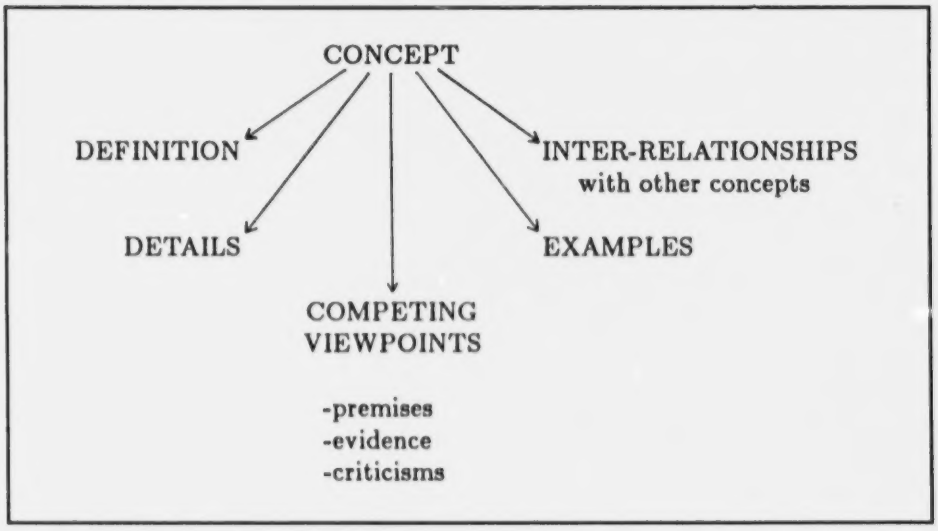


Fig 4.2 A selection framework

1. Concepts and Objects

These are the building blocks of any discipline. If you look through any course outline, or any table of contents in a textbook, you will immediately focus on some of the major concepts and objects. Titles and headings usually reflect these major topic areas. It is critical that a student not lose track of these organizing concepts. It is not uncommon for a student to be so engrossed with an example that she/he misses the concept that the example is illustrating.

2. Definition

How would you define a tree? _____

_____

Definitions are not always easily generated even for very familiar objects and concepts, so it is not uncommon for teachers and writers to define key ideas in several different ways. A common method is to give a functional or working definition, e.g., a tree is a living plant that manufactures food through photosynthesis. An alternative definition might be descriptive, e.g., a tree is a woody plant with roots, a trunk, branches and leaves.

3. Details (elaborated description)

This refers to currently non-contoversial knowledge about a concept or object. This may include descriptions of basic structure, operating systems, existing analyses etc. The key here is that at any point in time there is a general consensus within the academic community. This is not to suggest that knowledge is static but that general viewpoints do exist in any time period.

4. Competing Viewpoints (argument or debate)

Many disciplines thrive on argument. Debate is the essence of subjects such as philosophy and political science, and controversy is a key element in many undergraduate courses. The three most important components of any argument are:

1. The underlying assumptions or premises
2. Evidence in support of a point
3. Criticisms of the evidence

5. Examples and Analogies

The most common technique for clarifying and reinforcing ideas is to use examples and/or analogies. It has already been noted that it is critical for the student to focus on the concept that is being illustrated. It is also important to remember that both examples and analogies are limited in how well they can explain complex ideas. The analogy of man-as-a-machine was widely used in medicine and psychology, but its limitations eventually led to disuse.

6. Inter-relationships with Other Concepts

Concepts are rarely learned in isolation. They are part of a broader scheme of things, and when they have been defined, described, debated, and illustrated the natural extension is to explore their inter-relationships with other key ideas. This may be a natural transition to a new subject area or a way of exploring interdisciplinary topics.

The selection framework may seem like a complex idea at first. However, the six types of information are distinct, and with practice this type of model can become an important tool in discriminating among ideas.

MANAGEMENT BY OBJECTIVE AND QUALITY CONTROL

When you study it is a good strategy to set an objective or goal for what you wish to achieve. It is also a good strategy to have some way of monitoring the quality of your accomplishments, for example:

GOAL A — Read a chapter of the text and take summary notes.

MONITORING
1. Recall from memory some of the key points.
2. Make up some questions on what you have read.

GOAL B — Take lecture notes in class.

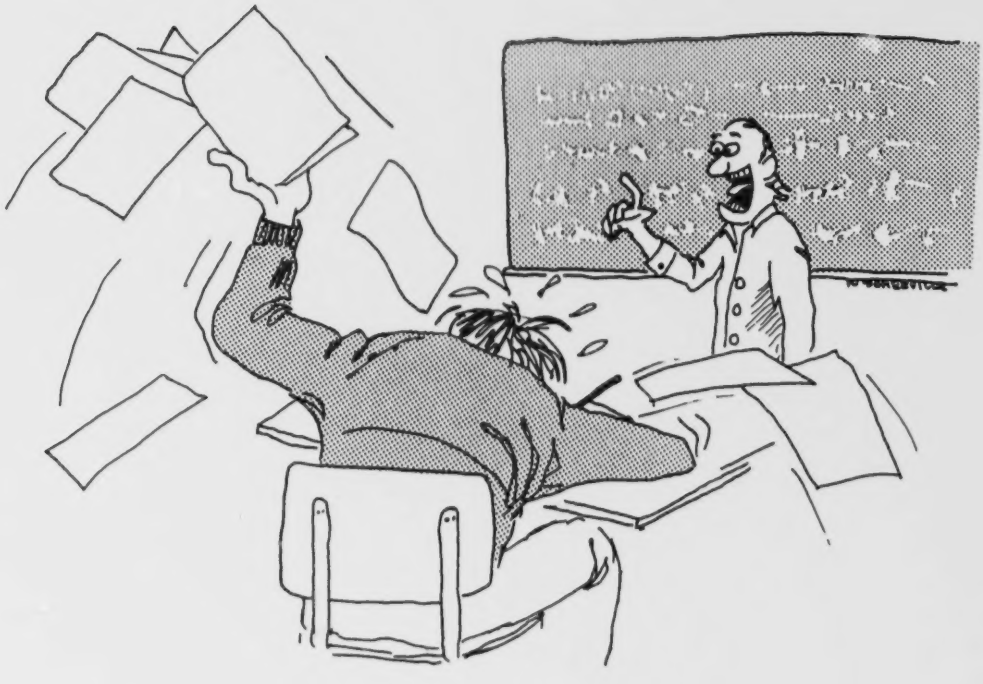
MONITORING
1. Reread the notes and add a title to represent the main topic of discussion.
2. Check that every phrase you have written makes sense and that you understand what it means.

Can you complete the following for your next five study tasks?

GOAL	MONITORING
1.	
2.	
3.	
4.	
5.	

5. LEARNING FROM LECTURES

- Inventory
- Reading the Lecture
- Suggestions for the 'Problem' Lecture
- Examples of Note Taking
- How Useful Are Lecture Notes?



INVENTORY

Consider the statements. If possible answer YES or NO. Fill in any other personal comments about the lecture situation in the blanks.

_____ 1. I usually take notes, but not with much care.

_____ 2. I write down as much as possible of the content of any lecture I attend.

_____ 3. I seldom reread my notes after the lecture.

_____ 4. My notes are never as clear as I would like.

_____ 5. Some lecturers are impossible to follow well enough to take good notes.

_____ 6. My notes are not consistent.

_____ 7. I am not always sure why I write down the things that I do write down.

_____ 8. Taking notes often interferes with my ability to listen carefully.

_____ 9. I always sit in the lecture room where I can see and hear easily.

_____10. If I concentrate on the main ideas, I miss other important facts or details.

_____11. If I find the lecture or lecturer boring I daydream and don't take down any notes.

_____12. _____

_____13. _____

_____14. _____

_____15. _____

READING THE LECTURE

University or college lectures afford an opportunity for teacher and student to meet and exchange knowledge. Usually the teacher or professor talks and uses visual aids to present information and ideas, while the student listens and records what appear to be the most important points. Both roles are equally important in the exchange since the teacher has to structure the pace and level of information while the student has the responsibility of listening, questioning and pursuing comprehension of the lecture material.

Not all lectures are the same for they vary according to the discipline, the teaching style and the student need. In the first few lectures of any course the teacher and student are becoming acquainted with each other's point of view. Some teachers invite questions and discussion; others prefer to use the lecture to present content and to handle inquiries outside the classroom. Some lectures are highly structured; others are more loosely organized. This requires the student to assess not only the content of a lecture but to evaluate the process in which he/she is participating.

Information about the course is usually supplied by the course outline which contains information about topics, text, assignments and evaluation. Each student has to try to make decisions about which strategies may be most effective in any course. To do this it is useful to consider the best approach to

1) Listening

2) Recording

3) Editing notes

As you read through this chapter put a checkmark by any strategy that you do not presently use. When you have finished the chapter make a decision on which new strategies you will try out.

Ways to Improve Listening

Before Lecture

a. Read ahead or Survey

b. Intention

c. Location

d. Note review

e. Outline of course

During Lecture

a. Opening Statements

b. Professor's cues

c. Organization of Material

d. Your own gen'l knowl.

e. Ask

f. Attention lapses

1. Listening

Active listening will help you to get as much as possible from a lecture. You may want to try the following to aid you in lectures.

BEFORE THE LECTURE BEGINS

a) Survey or read ahead in the text before class in order to recognize new ideas and vocabulary.

b) Go to class intending to listen. Recognize the active role which you play in the lecture.

c) Select a place to sit in the classroom where you can keep your attention on the lecturer and see and hear as well as possible.

d) Quickly review your notes from the previous class. This will help you to make connections with the previous lecture.

e) Check the course outline regularly to keep track of the sequence of topics.

DURING THE LECTURE

a) Listen for opening statements outlining topics, format or philosophy.

b) Watch the lecturer, not the rest of the class. Spend some time really watching the ways in which the lecturer emphasizes major points through voice, movements, pauses, etc. These cues will help you to discriminate between main ideas and supporting information.

c) Look out for the way in which the lecturer has organized the material. If it is not well structured, try to organize it for yourself.

d) Be aware of your general knowledge of the topic. Try to associate it with this new information to give it more meaning.

e) If you do not understand a point, ask for clarification (either during the lecture or after class).

f) Be aware of times when your attention may lapse, particularly around the halfway point of the lecture.

Selecting what to record

- Main ideas ↓
- Use abbrev. & incompl. sentences
- Keep in mind ↓ SELECTION FRAMEWORK!

Strategies:

a. Be early → outlines

b. Written notes

c. Emphasis & Repition

Why organize layout?

1. Learn more
2. Easier to read

Strategies:

a. Headings, dates, page #'s.

2. Recording

SELECTING

Since it is not usually possible to write down everything, it is necessary to pick out main ideas while the lecturer is speaking and to make notes. You will find that you need to use abbreviations and incomplete sentences at times to be an efficient note-taker. You will not need to write down everything that is said but only the key information. Use the selection framework described in chapter 4: THE LEARNING PROCESS.

Strategies which aid selection are:

a) Getting to class early to take down any outline that the lecturer may put on the blackboard or overhead.
b) Paying particular attention to the notes that the lecturer writes down in class.
c) Watching for the lecturer's use of emphasis and repetition.

ORGANIZING LAYOUT

You can improve your learning efficiency if you focus on making your notes as organized and as meaningful as possible when you are actually in the lecture. This focus on organization and meaning in the lecture has two benefits: 1) you will learn far more in the lecture itself and thus have much less to do on your own and 2) your notes will be much easier to read, edit and review after class.

Strategies which help are:

OVERALL ORGANIZATION OF NOTES

a) Using clear lecture title headings and dates or numbers on each page.

b. One side only

c. Margin for keynotes

d. Loose leaf binders

Ways to Org. Info:

a. White space

b. Set out headings & subheadings

c. List w/ bullets, #'s, or letters.

d. Big & label graphs & diags!

e. Alternate note structures

b) Writing on only one side of the paper. You can then use the other side of the page to add information from the text, additional examples or review questions.

c) Leaving a 2–3 inch margin on your notetaking paper and using it to keynote main ideas when you edit notes after class.

d) Storing lecture notes in loose leaf binders (as opposed to copybooks) so that you can add handouts, etc.

Ways to Organize Material in Notes

a) Leave lots of white space so that you can add comments later. Also the notes look better.

b) Select and set out headings and subheadings throughout the material by underlining, indenting, circling, etc., likely headings and subheadings. Otherwise the notes look like paragraphs of prose where little stands out.

c) Under headings and subheadings list important details with 'bullets' or numbers or letters.

d) Make graphs and diagrams *big* and *label* them well so that they will be meaningful to you later on.

e) Decide on alternate notetaking structures for different kinds of material. For example when ideas are compared you can draw a line down the middle and collect the relevant details on each side. Another example would be branching 'flowcharts' for step-by-step decision making.

Edit Notes Ein 24 hrs!!

strategies:

a. Regular time after lecture

b. Set objective:

i). keywords

ii). Brief. summ.

iii). Review questions

c. Note issues to be clarified

d. Personal reflections

e. Reread

Talk to other students & prof. re notes

Avoid Recopying Notes!!

3. Editing Notes

Research indicates that individuals forget 60% of random information which they hear, within 24 hours. If you do not reread your notes promptly you will forget a good portion of the lecture material. (See chapter 4: LEARNING AS A PROCESS.)

Strategies which will improve editing are:

a) Finding a regular time (15–20 minutes) close to the lecture to go through the notes which you took in class.

b) Setting an objective for rereading.
   i) Keywords in the margin can summarize main points. This chapter models how keywords might be used.
   ii) A brief summary of the whole lecture can be a useful review tool.
   iii) Making up 2 or 3 review questions can anticipate using the material in a test situation.

c) Noting down on the blank page opposite to the notes any issues which need clarification, and following up on this by getting help from the lecturer, teaching assistant or colleague.

d) Adding any personal reflections or expansion on the topic, also on the blank page or in 'whitespace' in your notes.

e) Rereading keywords (at least!) every two weeks in order to refresh your memory on course content.

You may wish to talk about the course with other students. You can learn a lot from the approach they take. It is also invaluable to find out what the professor's perspective is on the course and the approach he/she advises if you are having real difficulties. Since you will encounter many different types of lectures your role is to find the best approach to note-taking for each one.

WARNING!!!

Avoid recopying your notes — it uses up a lot of study time and you do not learn much because you are not actively selecting and organizing.

SUGGESTIONS FOR THE 'PROBLEM' LECTURE

Check your note-taking strategies in the following examples:

1. *You are having difficulty understanding lecture material.*

   Have you a) completed assigned reading before the lecture?
   b) reviewed previous notes on the topic?
   c) asked for help after defining as accurately as possible which issue is difficult to understand?

2. *You find you can't get everything down in your notes.*

   Check whether a) you really need to record every detail.
   b) your colleagues share your impression — can you exchange notes to fill in gaps?
   c) you can develop appropriate abbreviations.

3. *You seem to take down the 'wrong' information.*

   Do you a) attend to repetition and emphasis by the lecturer?
   b) note down any summary she/he gives?
   c) use subheadings to highlight the main points?

4. *You find that you haven't reread your notes after several weeks of class.*

   Consider whether a) the lecture notes are an important feature of the course or not. If not, focus more on listening in lectures.
   b) your notes are too disorganized as a result of a lack of editing.
   c) you can schedule review time into your weekly study plan.

5. *After two or three weeks you still can't follow the lecturer. You can't pick out what's important or where the lecture is going.*

   Try a) attending another lecture section in addition to, or instead of, the one you are assigned to.
   b) explaining the problem to the professor to see if she/he has some good suggestions for you.
   c) asking another student in the course if you can see the notes from the last lecture.
   d) talking to other students out of class to see what their perceptions of the course are.
   e) taping a lecture and listening again to the same material. Improve your original notes with this review.

EXAMPLES OF NOTETAKING

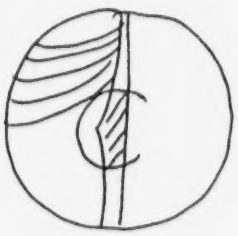
On the next 2 pages are samples of notes taken from the same lecture by two different students. In this lecture the professor showed slides and lectured, but he did not write anything down. Although both students attended the same lecture, student **B** has learned significantly more material and done this much more rapidly than student **A**. Student **B** is trying to follow the notetaking guidelines presented in this chapter. Specifically student **B** has:

1) used more white space
2) used abbreviations
3) tried to make each phrase meaningful
4) tried to lay out the material with some organization i.e. underlining, indenting, listening, etc.
5) spent 15 minutes shortly after class editing the notes by putting keywords in the margin, labelling the diagram and filling in missing information
6) dated and numbered the pages

A

Earthquakes

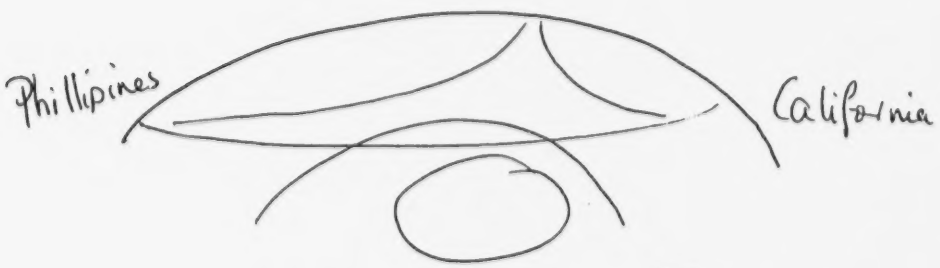
Earthquakes are of use to geologists. Today Earthquakes in China —— Earthquakes begin at a focus and free oscillations inside the earth and surface waves that can do damage. Inside waves are P and S waves. P waves push-pull and secondary waves go slower and not through liquid.



P and S waves

P waves go around circumference but S waves can't go through liquid.
Knowledge of time of arrival of the wave ? can give information to geologists.
There can be slight complications due to reflections of waves inside the Earth.

Victoria



B

Earthquakes
where we come from in course

Tues Nov 8. (1)

Earthquakes

So far earth matter in general.
Now earthquakes.

Why study eqks?

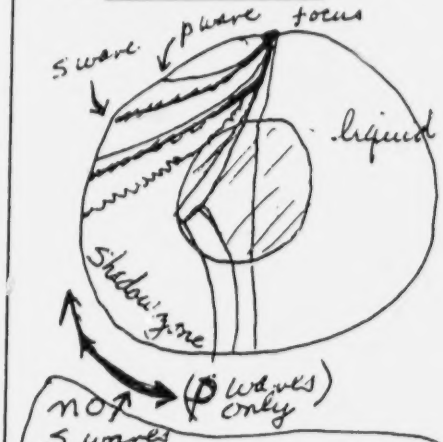
Eqk of use for info about inside of Earth eg (recent)
- China
- Turkey

Eqk focus + then waves:
1.
2.
3.

Eqk focus: Starts there then
- can oscillate Earth like bell
- Surface waves cause damage.
- Inside waves. p + s → that's what we study here

p + s waves are Inside

Inside Waves:



p waves
- push-pull
- faster

S waves (secondary)
- slower
- can not go thru liquid.

properties of p+s waves thru Earth

not s waves rec'd because liquid center!

Time of arrival + epicenter → info on:
1.
2.
3.
4.

Time of arrival of waves + Knowl of epicenter → info on:
1. How far thru Earth waves travel
2. Hardness
3. Density
4. Liquid or not

HOW USEFUL ARE LECTURE NOTES?

1. Joan's notes contain effective abbreviations and are a fairly concise record of lectures. In psychology she finds that her text overlaps with her lecture notes. She would like to combine the two sources of material. *What would be the best way of doing this?*

2. Bill finds that he understands his business lecturer better if he listens carefully and does not attempt to take notes. At the weekend he completes his record of the week's classes by using his text and remembering as much as he can. *List the ways in which he could improve his record of this professor's classes.*

3. Janet is a very conscientious student who takes careful and copious notes throughout all her lectures. Every two weeks she rereads them and files them away till the time of her review for exams. *How can she improve her strategy in order to make better use of her notes?*

4. Not only does John find it difficult to get to his 8:30 lecture in sociology but he can't take good notes from his lecturer anyway. He decides to skip the lectures and work from his textbook instead. *What comments would you make on this approach?*

6. LEARNING FROM TEXTBOOKS

- Self assessment of current reading strategies
- Getting to know the text
- SQ4R — A system for textbook reading
- Time for decisions
- Textbook troubles?

SELF ASSESSMENT OF CURRENT READING STRATEGIES

Of all the courses that you are currently taking, which would you select as your heaviest reading course?

_____

Think about that course for a moment, and in particular think about the last time that you were reading the textbook. What for you are three of the problems or issues that you were dealing with?

1. _____

2. _____

3. _____

Keep these in mind as you read through this chapter, to see if you can identify any strategies that might allow you to become a more effective reader.

With your heaviest reading course in mind complete the following inventory by checking as many of the statements as you feel represent your reading strategies. If your strategies are not present add them in the spaces provided.

1. Time management

a. every week I regularly read the required pages.
b. periodically I catch up by reading several chapters.
c. I only read the text when I am reviewing for a test.
d. I never (or rarely) read the text.
e. I read some of each chapter but don't usually finish it.
f. _____

_____

2. Approach

a. for any chapter I just begin at the first page and read the chapter straight through.
b. I spend some time looking through a chapter before beginning to read.
c. I read the summary before I read the chapter.
d. after I've finished reading the chapter I spend some time looking over the headings again.
e. _____

_____

3. Integration with the lecture

a. I read the chapter before the topic is covered in class.
b. I read the chapter after the topic is covered in class.
c. sometimes I read before and sometimes I read after the class.
d. I check the class notes against the text.
e. _____

_____

4. Concentration

a. I read where I won't be disturbed.
b. I often spend 3 or 4 hours reading without taking a break.
c. I take regular breaks after every hour or so.
d. I have a definite goal in mind as to what I want to accomplish, and I work towards it.
e. I daydream a lot when I read.
f. I allow myself to be easily distracted while I am reading.
g. _____

_____

5. Memory

a. I just read and try to remember.
b. I highlight.
c. I take notes from the chapter.
d. I use the study guide to reinforce the content.
e. I recite aloud or to myself to memorize important points.
f. _____

_____

6. Exam review

a. I reread everything for every test.
b. I reread my highlighting and/or my own summary notes.
c. I reread the text summary.
d. I use the study guide.
e. I ask the professor or other students about things I don't understand.
f. _____

_____

GETTING TO KNOW THE TEXT

Before reading a text, or section of a text, spend some time browsing through it. Find out about its background, content and organization. Surveying can establish expectations that can positively affect both reading strategies and comprehension of the material.

Background

1. *Who wrote the text? Was it one author or several?*

If the text is written by one author, you may expect a consistent style of writing. If several authors contributed then there may be considerable differences in style among the chapters.

2. *What information is given about the author and how does the author's perspective affect the content?*

In many disciplines there are differing viewpoints on important issues. For example, you would expect a political commentary from a conservative viewpoint to contrast sharply with one from a liberal author. It is important for the reader to identify the approach, if possible, before reading the text.

3. *When was the text written?*

Science and technology and consequently society develop so rapidly that information and perspectives quickly become outdated. Certain types of information date more rapidly than others. You should always check the date of publication to assess the relevence of the content. This will depend on the context within which you wish to use the information.

4. *Where was the text written?*

The cultural environment within which the author was educated will have played an important role in the development of his/her ideas. In some fields of study information is freely transmitted from one country to another, but in other cases it is not. Even when communication exists, the focus of study may differ drastically from one country to another.

The preface will often give answers to these questions that have been asked.

Content and Organization of the Book as a Whole

Look through the Table of Contents and check the chapter titles:

- what topics are included?
- what is the order of topics?
- is the book subdivided into major sections?
- what additional information is there — a glossary, appendix, index, etc.?
- how does the text match the lecture topics?

You should ask yourself, "what do I know about these topics? From my experience can I identify with any of these topics? Do I find them interesting, provocative, depressing, etc.?"

Content and Organization of an Individual Chapter

- how are the chapters organized; are they subdivided into sections, and if so, can the sections be easily identified from the headings?
- how are the points illustrated: with pictures, figures, tables?
- are any keywords listed?
- are questions included?
- how are key ideas and definitions highlighted?

Look through your text and check off the items as you identify them:

_____ 1. author's preface to text
_____ 2. table of contents
_____ 3. chapter headings
_____ 4. introduction to each chapter
_____ 5. headings within each chapter
_____ 6. figures, illustrations etc.
_____ 7. conclusions or summary
_____ 8. list of keywords
_____ 9. questions or problems based on the chapter
_____ 10. glossary
_____ 11. appendix
_____ 12. index

Before reading any one chapter, look carefully again through the table of contents at the front of the text. Check which topics are covered, and in what sequence. What is the logic behind that particular order of topics? Is the author building a case for any particular argument? How does the chapter that you are about to read link with those immediately before and after it? Each chapter will make more sense when viewed in the context of the entire text.

SQ4R — A SYSTEM FOR TEXTBOOK READING

SQ4R is an adaption of a system first described in 1946 by Francis P. Robinson, an educator whose special interest was the development of more effective methods of learning for average and superior learners. He termed his system of SQ3R — 'a higher-level study skill' — and he made note that such skills:

1. should be individualized to each student's need
2. demand actual practice under supervision
3. should be allied as closely as possible to a student's lessons in actual courses
4. need to be seen as important and worthwhile by a student

However, while recognizing these constraints, Robinson did introduce SQ3R in a self-help book for university studen[illegible] SQ4R, as it is adapted here, is not a single strategy. It is an acronym that con[illegible]iently brings together many strategies that have been found to be effective. It is for you to decide which of these strategies is useful for you. Consider each in terms of:

- Do I already know, and use, this?
- Will it make a positive contribution to my studying?

understanding	S	Survey	= look over, glance through
	Q	Question	= ask yourself questions about the chapter
	R	Read	= read carefully to understand

memory	R	Record	= highlight and/or make marginal or summary notes.
	R	Recite	= recall from memory points that are important
	R	Review	= check through the chapter immediately after reading it, and periodically after that. Devise ways to self test. Use a study guide if possible.

Survey by looking for the following:

1. Chapter title (What does it mean? What is the chapter about?)
2. Headings and subheadings (What are the topics and how are they organized?)
3. Introduction and summary (What do they tell you about the content?)
4. Captions (What is illustrated in the pictures, figures and tables?)
5. Bibliography (What are the extra sources on this topic?)

When you have spent 10-15 minutes surveying the chapter, make an outline of all the headings in the chapter. That is, write down the chapter title, then list all the headings and subheadings. Look at the following outline for chapter 4 *Learning* in the introductory text, PSYCHOLOGY, 2nd edition, (1986) by Henry Gleitman, published by W. W. Norton and Company Inc.: New York.

1. Habituation

2. Classical Conditioning
   - Pavlov and the conditioned reflex
   - The major phenomena of classical conditioning
   - The scope of classical conditioning
   - What is learned in classical conditioning

3. Instrumental Conditioning
   - Thorndike and the law of effect
   - Skinner and operant behaviour
   - The major phenomena of instrumental conditioning
   - What is learned in instrumental conditioning

4. Behaviour Theory and Human Disorders.
   - Behaviour therapy
   - Behaviour theory and medcine

5. Some limitations of behaviour theory
   - The biological constraints on learning
   - cognitive learning
   - the generality of behaviour theory

Summary

There are two main reasons for making the outline of the chapter

a. It is an overview of the whole chapter. If you know what topics are covered and in what order, before you read, you will be able both to understand and remember the information better. The outline sheet emphasizes the organization of the topics in the chapter.

b. It is a useful review tool. You can review a whole book by reading through the outline sheets that you made for each chapter. The keywords in the headings will act as cues to your memory and recall of the concepts in each chapter.

Question the chapter as you survey, read and record the key ideas. Asking questions is a strategy that begins as soon as you open the first page and continues until you have read the last word. Try the following:

1. See if you can turn the headings into questions.
2. Activate your general knowledge by asking, "what do I already know about this topic?"
3. Check for questions at the end of the chapter.

Look back to the outline on the previous page and generate two questions for the first heading.

question 1._____

_____

question 2._____

_____

By asking questions you take an active role in the learning process. You will be more alert as you read. It is particularly important to reflect on how this new knowledge fits with your present general knowledge. It is seldom that you will be reading about a topic that is completely new to you. Linking new information to old is part of both the comprehension and memory processes. Always ask that most important question, "what do I already know about this?", but also ask questions on every aspect of the content and the process.

Read carefully the section in the chapter. The amount that you will want to read before stopping to highlight or make notes will vary with your preference and with the type of the material. You may prefer it to be one paragraph, one page, or one distinct section. Keep the following points in mind:

1. Pay particular attention to the heading for any section. That will set up certain expectations.
2. Read to understand. Your speed will vary with the text.
3. Your reading should answer the questions that you have just asked.
4. Read all the words or phrases in boldface type or italics very carefully. They are printed that way for a purpose.
5. Use the selection framework described in chapter 4: THE LEARNING PROCESS to identify the: concepts; definitions; details; competing viewpoints; examples; and inter-relationships among concepts.

Record the information that you select as being important, and that you wish to remember. There are a variety of methods and you do not need to use them all! Consider the following:

1. *Underline and/or highlight*. You may wish to develop a set of symbols for different kinds of information e.g. brackets, boxes, asterisks and circles. If you read to understand first,and then go back to underline or highlight, you will have more success in selecting only the important points. Avoid highlighting too much. Concentrate on the important key ideas.
2. *Add keywords and/or brief notes to the margin*. Again, focus on the main ideas or details for these keywords and marginal notes.
3. *Make a separate set of summary notes*. Condensed notes can save time when you review . They reduce the interference that occurs when processing too much information in too short a time period. Translate the ideas into your own phrases, rather than copying verbatim. Also, read at least a page before summarizing ideas, or you will most likely take too many notes. You may find yourself re-copying the text!
4. *Develop a diagram to illustrate main ideas and relationships between them*. For some people, the more graphically the information is displayed, the easier it is to remember. This technique is sometimes referred to as cognitive mapping.
5. *Make up test questions*. If you can translate a chapter into a set of test questions you may be anticipating the test. Trade your questions with a friend. This can help both of you.
6. *List keywords*. Go through the chapter when you have finished reading and make a list of keywords related to the important ideas.

Recite the important information from memory. This is an important step in transferring information from short-term to long-term memory. Try all or some of the suggestions:

1. Cover the page. Recite silently, or out loud, the points that you just read. If you can't remember, re-check the page and try again.
2. You don't need to have the text or notes with you when you recite. When you have a few spare minutes (at the bus stop, or when you are walking between classes) try to recall the organization of a chapter by reciting the headings.
3. Think about the keyword list that you made. How many of those keywords can you recall?

Review is the last step in SQ4R. It is a very important step, and can take place:

1. Immediately after reading a chapter, in order to put it all together. This should not take too long, because the information is still fresh in your memory.
2. By using a study guide if one accompanies the text. Answer the questions as a review.
3. Every two weeks to integrate the material as the course progresses.
4. Before the exam. Plan a definite amount of time to spend in careful, thorough review.

Final Comments on SQ4R

Try the SQ4R system with one text to begin with. It may feel awkward at first, but give it a real trial. You will probably feel comfortable with it and see an improvement in your ability to read a text, understand the content, and be better prepared to do a thorough review.

It is important to realize that textbook reading involves two distinct goals and that if you aim for both at the same time you may not be very successful at either. The goals are:

1. reading to understand
2. reading to remember

TIME FOR DECISIONS

As you can see, there are very many different strategies introduced in this chapter. It is therefore really important for you to look over them again and make some decisions about the way in which you will approach reading textbooks.

Remember, not all texts are the same and your goals for reading will also vary from course to course. You will have to make decisions for each course individually. Choose one course now to keep in mind as you review all of the strategies that can be part of SQ4R. Make some decisions on useful strategies for that one course.

COURSE _____

SURVEY

_____

_____

QUESTION

_____

_____

READ

_____

_____

RECORD

_____

_____

RECITE

_____

_____

REVIEW

_____

_____

TEXTBOOK TROUBLES?

1. Mike has been busy the first month of school with class, add/drop,residence parties etc. He hasn't bought his textbooks but relies on his friends and uses theirs when they're finished. *Why is this a poor approach?*

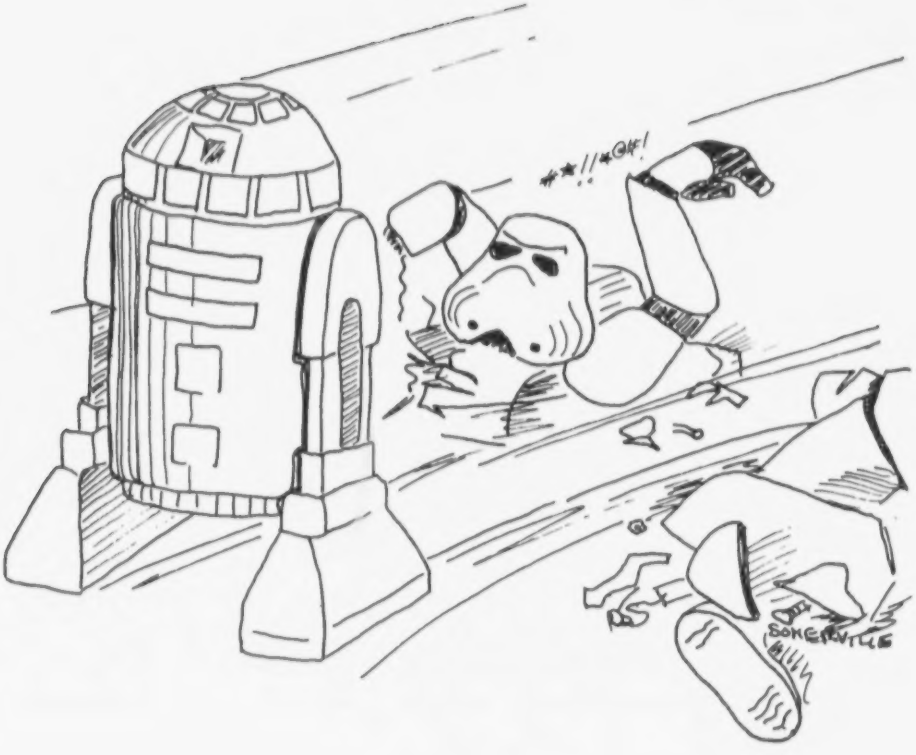
2. Julie is a really serious student who reads each chapter. She always makes notes but sometimes wonders if this is the best use of her time. *What suggestions can you offer?*

3. Susan makes herself sit down and read at least three hours a night, reading for one course per night. In spite of all this preparation she does not join in class discussions because she cannot remember what she has read. *Any suggestions?*

4. Alan doesn't like reading. He finds that he gets sleepy about 15 minutes after he begins. *How can he maintain a better approach?*

7. SCIENCE PROBLEM SOLVING

- Introduction
- General Strategies for Problem Solving Courses
- Specific Strategies for Problem Solving Courses
- A Few Ideas About Exam Preparation



INTRODUCTION

Problem solving courses such as mathematics, physics, chemistry, statistics, etc. present some unique, and often difficult challenges to the student. Consequently, the student intending to be a ***good strategy user*** will look for appropriate strategies to handle these courses. This chapter introduces strategies intended to improve performance in problem solving courses. Although many problem solving strategies have been put forward by others, the ones presented here were selected because:

a) they are fairly easy to monitor, that is you know whether you are using them or not.

b) they are not 'that obvious', that is most of these strategies are either underused or not used at all by most students.

This chapter is in two parts. The first part looks at general strategies that involve use of time and resources. The second part presents specific strategies for studying, in other words ideas about what to do while you are studying problem solving courses.

GENERAL STRATEGIES FOR PROBLEM SOLVING COURSES

1) *The majority of your study time must be spent actually solving problems.*

Many students spend far too much time reading and re-reading the text and trying to memorize formulae and solved examples. Because exams in problem solving courses require that you solve problems, you need to practice doing just that. Therefore you should try to learn the basics of each concept as quickly as possible and then get right into solving problems. This also means concentrating on learning the basics *in the lecture* (as opposed to just copying the notes) so that you can minimize the time you need to read the text. Once an understanding of the basic concepts is reached, try to re-solve the solved examples in both the text and the lecture before starting the practice problems.

2) *Find and do harder problems (that are appropriate).*

Exams in problem solving courses tend to focus on the harder problems in the course so, quite naturally, your study time should reflect that bias. Not only is it important to solve quite a few problems, it is also important to solve a number of the harder problems. Harder problems often intimidate students, but the point of this strategy is that you need to look for and to prepare the

harder problems rather than avoiding them. A number of the other strategies in this chapter deal with ways of approaching harder problems.

3) *Set a time limit (usually 15 minutes) on each problem you attempt.*

This may be the most important strategy of the chapter but it is also a very difficult one to follow consistently. Many students easily get 'hooked' when trying to solve a problem and spend one or two hours trying to 'get that darn problem!' Unfortunately if you run across a few problems like this you could expend a lot of study time and have very little, other than frustration, to show for it. This 'getting hooked' pattern is certainly an important factor in the failure of many science and engineering students. So plan to attempt at least four problems in one hour and after the first 15 minutes (use a timer if necessary) go on to the next problem even if you are stuck on the first one. What do you do about the problems you cannot solve? The next strategy suggests some ways to get 'unstuck'.

4) *Develop useful help sources.*

When stuck on a problem most students typically consult their lecture notes and text but often these sources do not help. However there are other resources such as the professor, tutorial assistant, help centre, tutors, students, and different texts and solution books (e.g. Schaum's outline series). Good students often use a greater range of help than do less successful students. However, to use resources you first have to locate them. In order to use help resources effectively keep track of the difficulties that you encounter. Small groups of students (2 to 4) working on problems together can also be an excellent resource.

e) *Have the necessary background and skills.*

Because many problem solving courses, such as statistics, physics, are required for certain programs or degrees, there is a great temptation to attempt these courses without having the adequate background knowledge and skills. This makes a difficult course just about impossible. To avoid this trap make an early investigation into any special problem solving courses you need to take. Talk to the professor, get a course outline or old exam and see what kind of background is really necessary. If your background is weak there is a variety of ways to remedy this. Many institutions have specialized learning centres that offer diagnostic testing and self-paced instruction; correspondence high school subjects are available in a variety of subjects; if your weaknesses are not too serious you could try working through an appropriate text on your own.

SPECIFIC STRATEGIES FOR PROBLEM SOLVING COURSES

Three specific strategies are presented to help you study problem solving courses more efficiently. Each deals with a separate issue crucial to success in problem solving. These issues are:

a) learning and understanding the essential conceptual information such as definitions, formulae, etc. that is required to attempt problems involving specific concepts. (Concept Summary)

b) learning how to apply this specific conceptual information to solve the problems you are assigned. (Decision Steps)

c) keeping track of, and preparing for, the harder problems associated with each specific concept you are taught. (Difficult Problems)

The strategies presented here encourage you to write down the information associated with each of the three strategies for every concept that you are taught. At first this act of writing down information may seem a bit awkward. However, most students who have done it consistently report that they find it more helpful and efficient than just 'bashing away' at a lot of problems without any conscious or coherent summary of their efforts. Anyway, whether you write down this information or not, these three issues are ones you will have to confront in any problem solving course.

Before going on to the details of these three strategies it might be useful at this point to consider how you currently approach problem solving courses. The survey on the next page gives you an overview of the strategies in this chapter in a checklist format.

Survey Your Approach to Problem Solving Courses

		Frequently	Occasionally	Rarely/Never
1.	I have the necessary background and skills to handle my courses.	_____	_____	_____
2.	I work on learning the basics of each concept in the lecture (vs. just taking notes).	_____	_____	_____
3.	I make a prompt, brief review of my notes before the next class.	_____	_____	_____
4.	I spend the majority of my study time in the course actually solving problems.	_____	_____	_____
5.	I look for and attempt many of the harder problems associated with each concept.	_____	_____	_____
6.	I stick to a time limit on each problem I attempt.	_____	_____	_____
7.	I have developed a variety of help sources for when I'm stuck.	_____	_____	_____
8.	I focus on learning & understanding the basic principle associated with each concept i.e. crucial formulae, definitions, explanations, etc.	_____	_____	_____
9.	I carefully analyze and try to understand how a general concept is applied to a specific solved example (vs. memorizing the examples).	_____	_____	_____
10.	After getting the solution to a harder problem I reflect on what made that problem difficult.	_____	_____	_____
11.	I try to predict the harder problems that are likely to appear on the exam.	_____	_____	_____

Specific Strategy 1: Concept Summary

As in other types of courses, students in problem solving courses need to use a framework or checklist to select the crucial information. The concept summary is such a checklist to find out what you know or don't know.

THE DETAILS OF A CONCEPT SUMMARY

For each concept you encounter, keep track of most or all of the 5 items shown below. If possible make a brief written summary (1 page or less and in point form) consisting of, at least, the first 3 items:

1. ***Formula(e) (most general and usable)***

   Usually a specific concept consists of 1 (or *a few* more) crucial formulae. All other related formulae are special cases that can be derived easily from these 'first principles' and so these other formulae should *not* be learned.

2. ***Definitions (including units and symbols)***

   For every new term in the formulae.

3. ***Additional Important Information***

   This is information needed to apply the formulae correctly: sign conventions, assumed values, when formulae do *not* work, etc. ...

4. ***Explanation in Own Words/Diagram (Qualitative)***

   This is a good test of understanding. Trying to answer the question, "What does this concept allow us to predict/describe?" forces you to think more deeply about the concept. Often your own diagram or a real-life example of this concept at work can be very helpful in this regard.

5. ***Proof or Derivation***

   It is often *not* necessary to learn proofs fully, as they can be abstract and time-consuming. However, some idea of a proof can be useful.

Comments

The amount of a lecture or chapter that can be considered as *one* concept is a little tricky at first. It is better to tend towards larger chunks of information for convenience. For example, the concepts of acid, base, and pH can go together as one concept rather than as three separate concepts.

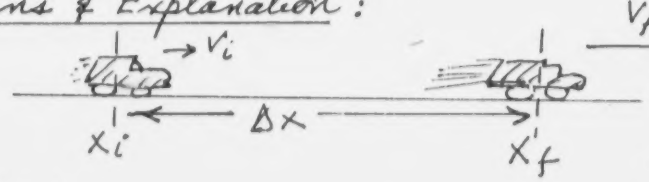
Example of a Concept Summary:

Equations of Constant Acceleration (1-D)
1-dimensional

Formulae:

1. $V_f = V_i + a(\Delta t)$
2. $X_f = X_i + V_i(\Delta t) + \frac{1}{2} a(\Delta t)^2$
3. $V_f^2 = V_i^2 + 2a\Delta x$

Def'ns & Explanation:



Formulae relate any 2 pts on path of accelerating object.

where:
V_i, V_f are initial & final velocities of the object in m/s
a is acceleration of object in m/s^2
x_i, x_f are initial and final positions of the object in m.
Δt is time taken to travel from i to f points on path in s.

N. B. (additional Important Info):

1. $g = 9.8\ m/s^2$ downwards
2. x, V, a are vector ∴ choose + direction & be consistent! eg object thrown up ↳ V_i = + but $a = -9.8\ m/s^2$
3. These equations only for constant accel. eg if $x = 5t^3$ → no good!, use derivatives etc.
4. Δ means (final quantity − initial quantity) ∴ $\Delta x = x_f - x_i$ or $\Delta t = t_f - t_i$.

Specific Strategy 2: Decision Steps

Good problem solving essentially involves making accurate decisions about the application of appropriate concepts to specific situations. It is easy to follow the professor's accurate decisions about how to apply a specific concept to a problem, but when you are faced with a new problem to solve on your own it is often difficult to know where to start — i.e. what decision is first? If you are like many students you may try to handle this situation by either plugging into formulae blindly, or trying to memorize every solution you can get your hands on. Neither of these approaches works very well. A better approach is to keep track of the 'Decision Steps' you need in order to solve problems logically from first principles (i.e. Concept Summary).

THE DETAILS OF DECISION STEPS

1. *Make Decision Steps in Writing In Your Own Words*

   The steps of correctly solved examples should be carefully analyzed by answering one or more of these questions for each step:

   What was done in this step?
   How was it done (i.e. which formula or guideline was used)?
   Why was it done?

   Good decision steps can clarify basic problem solving tasks for specific concepts: identify knowns and unknowns, applying formulae as needed, etc.

   To be most useful, Decision Steps should be brief and focus on steps you find tricky.

2. *Use and Revise Your Decision Steps*

   After you have made a few decision steps based on the analysis of a solved example, try to 'test-run' these steps on a similar problem. Usually your initial decision steps are imperfect and incomplete so revision is needed.

COMMENTS

These steps focus on the key decisions that lead to correct application of a concept, instead of focussing on the computations that result from good decision steps. Frequently professors will *say* in lectures what decisions they are making but these decisions are not written down so students focus on the mathematical equations which are written down. Try to write these decision steps in words if at all possible. After revising your decision steps once or twice you may want to write them down more neatly beside one or two solved examples (as shown in the example on the next page).

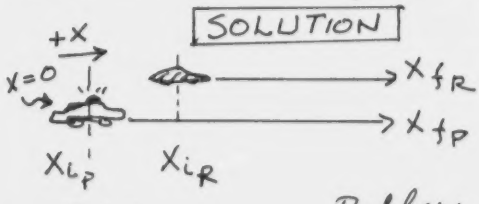
EXAMPLE OF DECISION STEPS : (For 1-D, 2 body motion prob)

Problem: A police car begins accelerating from rest at $2\ m/s^2$ in pursuit of a pair of bank robbers who are travelling in a getaway car at a const. vel. of $30\ m/s$. If the police were originally 100 m behind when they started, when & where will they catch the robbers?

STEPS

1. Diag i & f for each body.
2. $+X_i$ origin.
3. I.D. i & f info for each body (watch X_i's & signs!)
4. Apply $X_f = X_i + V_i(\Delta t) + \frac{1}{2}a(\Delta t)^2$ to each body.
5. Relate X_f's eqn's of each body (usually equal).
6. Solve & check answer/origin/signs.

SOLUTION



Police	Robbers
$V_i = 0$	$V_{i_R} = V_{f_R} = 30\ m/s$
$a = +2\ m/s^2$	$a = 0$
$X_{i_P} = 0$	$X_{i_R} = +100\ m$
$X_{f_P} = ?$ ⟷ same ⟷	$X_{f_R} = ?$
$\Delta t = ?$ ⟷ same ⟷	$\Delta t = ?$

$X_{f_P} = 0 + 0 + (\Delta t)^2$; $X_{f_R} = 100 + 30(\Delta t)$

$\rightarrow X_{f_P} = (\Delta t)^2$; $X_{f_R} = 100 + 30(\Delta t)$

$\therefore (\Delta t)^2 = 100 + 30(\Delta t)$

$\rightarrow (\Delta t)^2 - 30(\Delta t) - 100 = 0$

$\rightarrow \Delta t = 33.0\ s$

and $X_{f_P} = (33.0)^2 = 1089\ m$; check $X_{f_R} = 100 + 30(33.0) = 1090\ m$ O.K.

from where police started

What the abbreviations in each step mean:

Step 1 Make a diagram of the initial and final points for each body.
Step 2 Choose a $+X$ direction and choose an origin (arbitrary decisions but state them).
Step 3 Identify the initial and final information from your diagram on a table as shown.
Step 4 Apply that formula using the information for each body from your table to get $X_f = f(t)$.
Step 5 Mathematically relate the equations from Step 4 (usually equations are equal).
Step 6 Solve resulting equations and check X_f values for each body. Remember your origin and watch signs.

(Making abbreviated steps for *one* example like this can be very helpful!)

Specific Strategy 3: Difficult Problems

Have you ever thought about what makes one problem more difficult than another? This strategy looks at some common ways to make problems difficult. The intention in doing this is to change your perspective from that of a *passive receiver* (victim) of difficult problems to that of a *strategist* who effectively anticipates difficult problems.

1. *CLASSIFY DIFFICULT PROBLEMS IN WORDS.*

Try to classify each difficult problem you encounter by identifying in words (quite apart from the specific content if possible) the way or ways you feel that problem was made difficult. Here are some common ways in which problems are made difficult (feel free to add others).

a) *Hidded Knowns:* Needed information is hidden in a phrase or diagram, e.g. 'at rest' means v=0.

b) *Multi-part: same concept:* A problem may comprise two or more sub-problems, each involving the use of the same concept. This type of problem can be solved only by identifying the given information in light of these sub-problems.

c) *Multi-part: different concepts:* Same idea as above, except now the sub-problems involve the use of different concepts.

d) *Multi-part: simultaneous equations:* Same idea as above, except no one sub-problem can be solved fully by itself. You may have 2 unknowns and 2 equations or 3 unknowns and 3 equations and you will have to solve them simultaneously, e.g. through substitution or comparison, addition or subtraction, etc., ...

e) *Work backwards:* some problems look difficult because to solve them you have to work in reverse order from problems that you have previously solved.

f) *Letters only:* When known quantities are expressed in letters, problems can look difficult. If you follow the decision steps these problems are not usually so difficult.

g) *'Dummy' variables:* sometimes a quantity that you feel should be a known is *not* specified because it is not really needed, i.e. it cancels out, e.g. mass in work-energy problems, temperature in gas-law problems, etc.

h) *Red herrings (extra information):* A problem may give you more information than you need. This can be unnerving if you expect to use all the given information in a problem.

2. *ANTICIPATE DIFFICULT PROBLEMS*

For each concept you study try to make a list of the difficult types of problems encountered as well as difficult types that are possible and 'testable' using the above list of ways to make problems difficult.

EXAMPLE OF A LIST OF DIFFICULT PROBLEMS:

CONST. ACCELERATION IN 1-D

I. 1 BODY PROBLEMS:

1. 1 part "simple" (eg. cyclist accelerates)
2. 1 part up-down or change direction (eg. sandbag dropped from rising balloon).
3. 2 or more parts (eg. train speeds up then slows down).
4. 1 of the parts is const. vel. (eg train speeds up, then const vel, then slows down)
5. Calculate avg. vel = $\frac{\Delta x}{\Delta t}$ in these "multi-part" problems (eg train previously)
6. 2 parts simultaneous equations. (eg. Rock free falls + sound back up).

II. 2 BODY PROBLEMS:

1. "Simple" i.e. not simultaneous (eg car + truck accelerate for 3s).
2. Simultaneous i.e. equations required:
   a) Initial x's are different (eg police + robber)
   b) Initial t's are different (eg coconuts down
   c) One body has 2 parts to its motion. diff!

Explanation

The student here has classified all the problems she/he has seen with this concept into 'sub-types' that identify important differences in the structure and difficulty of the problems. Note that many sub-types are specific examples of the *ways to make problems difficult*.

The student has also included key words about specific examples that typify that sub-type, e.g. cyclist problems, etc. ...

A FEW IDEAS ABOUT EXAM PREPARATION

The strategies presented in this chapter will help you to prepare effectively for exams that are involved with problem solving courses and to help you to avoid many of the pitfalls that have trapped so many students before. If you follow these strategies then by the time the exam approaches you will have:

a) solved a good number of the harder problems (using the general strategies)

b) analyzed and summarized the main concepts and how to apply them to problems (using the concept summary and decision steps)

c) predicted possible harder exam questions (using difficult problems), somewhat like the way athletes and teams will 'scout out' the opposition before the big game.

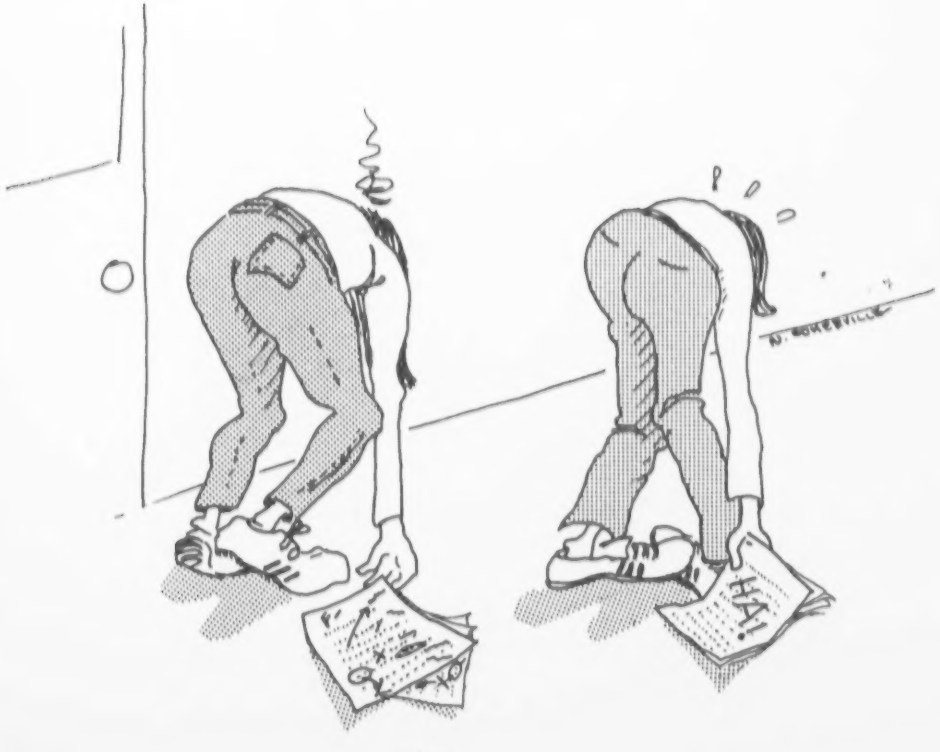
Furthermore, if you have written out the concept summary, decision steps and difficult problems for each concept, you will have information in an 'easy-to-review' format.

No matter how much work you have done, however, you will still need to do some review when preparing for the actual exam. One effective way to review a lot of problems quickly is to do ***uncalculated solutions***. This means that you resolve a few difficult problems associated with each concept by figuring out what decision steps are needed to solve each specific problem but you do not carry the algebraic calculations which can be quite time-consuming. Yet another useful strategy that many students use the day before the exam is to make a ***formula list*** on which only the 'first principle' formula for each concept is shown. This list should be rehearsed frequently before the exam so that no crucial formulae are forgotten.

In addition to preparation strategies it is also a good idea to practice specific 'exam-writing' strategies since 'on-exam' errors can be costly. Exam writing strategies for problem solving courses and other types of courses are discussed in chapter 10: WRITING EXAMS.

8. WRITING ESSAYS

- Introduction
- Features of a Good Essay
- Analyzing the Essay Assignment
- Myths About Essays
- Form of an Essay
- Stages of Composition
- Activities of Each Composition Stage
- Paragraph Structure



INTRODUCTION

Considering the complexity of researching, planning and writing an essay, it is remarkable how well most students perform this task. Since it is probably true also that most of us do this task without any clear model of the 'ideal' version that we are aiming for, it is all the more amazing that so many reasonable essays are submitted year after year.

It's also true that a great deal of energy is wasted and frustration experienced in the process of getting essays completed. Some of us may have been lucky enough to have had some explicit instruction about how to construct an essay, but for many it is a trial and error process. Though individual style can be very important to a well written essay there are common characteristics that are also monitored by markers.

FEATURES OF A GOOD ESSAY

1) The effective essay is expected to present information in a cohesive and reasoned way, so that the reader can follow points from start to finish.
2) While, in some instances, a descriptive essay may be sufficient, a more common expectation is for the information to be contained in a central theme or argument, usually stated as the thesis of the paper.
3) A good essay usually references a variety of sources of information and commentary. These will vary depending on the discipline in which you are writing. Some advocate the use of secondary sources while others want some allusion to primary documents which can lend authenticity and credibility to your argument.
4) It is expected that these sources will be woven into an analysis that clearly explains the central issues. This is where originality and lack of jargon will be most rewarded.
5) The final presentation of a good essay will be more impressive if it is written in accurate sentence structure and appropriate paragraphs with acceptable grammar and spelling.

ANALYZING THE ESSAY ASSIGNMENT[1]

Every essay grows out of an 'assignment'. And nearly every assignment (whether an elaborate set of printed instructions, or a few briefly muttered suggestions from your instructor, or entirely the product of your own devising) requires that you answer certain questions before writing a satisfactory essay. Sometimes, the assignment explicitly answers these necessary questions. More often, however, you are expected to 'read between the lines' and decide for yourself what kind of essay the assignment requires. These ten questions can help you to chart a truer course.

1.	**Formal Conditions:**	What are the requirements of length, due date, typing, documentation, etc.?
2.	**Latitude:**	How much freedom do you have to modify the terms of the assignment, to choose your own way of answering these questions?
3.	**Subject:**	What precisely are you to write about?
4.	**Purpose:**	Why are you writing about this subject?
5.	**Viewpoint:**	What should be your stance as author?
6.	**The 'Givens':**	What information, assumptions, and materials do you and the reader begin with in common?
7.	**Definitions:**	Are there keywords or concepts you must define?
8.	**Organization:**	What information, materials, ideas, subtopics, questions and answers must stand out in your essay?
9.	**Beginning and Ending:**	Is there a particular point that you must start from and/or arrive at?
10.	**Sources:**	Where can you (and where should you) get the content you need?

When in doubt, ask your instructor before you start to write. But do not ask her/him to answer the questions that appear on this list. Instead, ask for help in deciding which of your alternative answers to the questions would most likely lead to a good essay. Because you have thought about the problem, and because she/he wants to read a good essay, you will be more likely to receive helpful answers than if you ask "What are we supposed to do?"

[1] Adapted from materials by Joan McCurdy, Brock University

MYTHS ABOUT ESSAYS

a) *'You have to include reference to everything that's been written before about the topic'.*

It's not necessary to have consulted every available source of information or even to assume that you have to find that definitive review. Some care about referring to recent sources, or finding out who is a significant writer in a field, will pay off but you may limit your paper to the use of a few key items.

b) *'You have to think up something original that hasn't been said before'.*

This puts you back in the trap described above, and also reflects the myth that a student's role is to come up with a completely new interpretation. This is seldom necessary in undergraduate essays. As mentioned on the previous page, originality is illustrated in the way the argument is presented, rather than the fact that no one has argued this point before.

c) *'The longer you research, the better your ideas will be'.*

Since an important feature of the essay is the way you structure your thoughts on paper about the topic it is important to move into this early enough to organize well. Too much information can be a drawback and many students spend much more of their time researching than is useful. At least 50% of your available time should be put into the organization and writing stages.

The term 'essay' is derived from the French verb 'essayer — to try'. The essay is your attempt to express a reasoned argument, given the specifications of your instructor. No essay is ever the last word, or necessarily the best way of writing about a topic.

FORM OF THE ESSAY

Introduction

broad statement or announcement of subject

explanation, detail - generation of interest

thesis statement

sometimes a route map outlining the sub-topics is appropriate

Body

paragraph — by paragraph development of the arguments in support of the thesis

usually four or five main points developed in paragraphs or groups of paragraphs

points are arranged, where possible, in order of increasing importance; the strongest argument comes last; if possible, begin with a relatively strong argument

Conclusion

restatement of thesis

possible naming of implications, wider significance

final statement on the subject

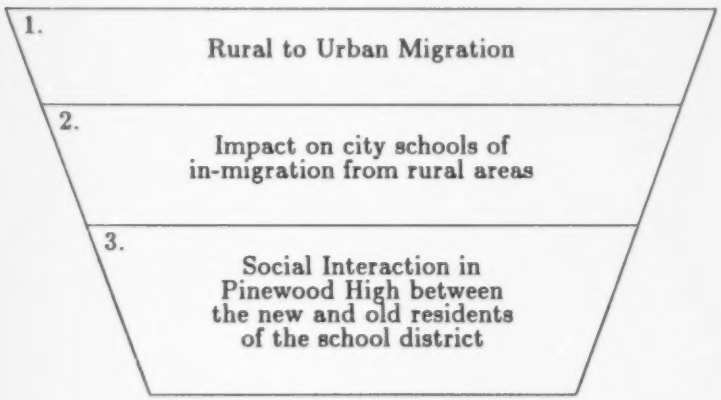
STAGES OF COMPOSITION

1. Choosing and narrowing a topic or interpreting the question.
2. Information gathering.
3. Planning a point-form outline.
4. Writing a draft.
5. Editing the draft.
6. Final presentation.

Given that these six steps are involved it is helpful to plan how long you are going to spend on each step. Though this is difficult to estimate, setting a deadline for each step is one way to start. Coherent essays seldom result from an inspirational last night effort, but rather, like most good writing, from revision and editing successive drafts. More specifics about time management are contained in chapter 2: ORGANIZING YOUR STUDY TIME.

1. Choosing and narrowing a topic or interpreting the question.

a) If you have been allotted a broad topic, or are free to choose one it is necessary to *narrow* the scope to a subject that is less general, e.g.,



b) If you are given a statement or question to consider you will have to analyze the issues, e.g. Computers will 'Revolutionize' Society.

You may ask, "What kind of computers?" — "What does the term 'revolutionize' society mean?" Does the change extend to all of society or will it be limited to business, social or economic concerns?

2. Information Gathering

This is the stage of checking out different sources to find out what is available. Of course you do not have time to read everything. It is necessary to make a decision about the most pertinent sources. Consider checking for:

a) old and new sources

b) a minimum number of sources, possibly 6–8, which would be acceptable

c) certain viewpoints which you may have noticed in lectures or discussions

It is common for students to spend too long in this stage before making any decisions. Being able to skim and scan a variety of sources can cut down on this time. Skimming through paragraphs and making brief summaries, for example, can often help to establish how an author is using information and evidence.

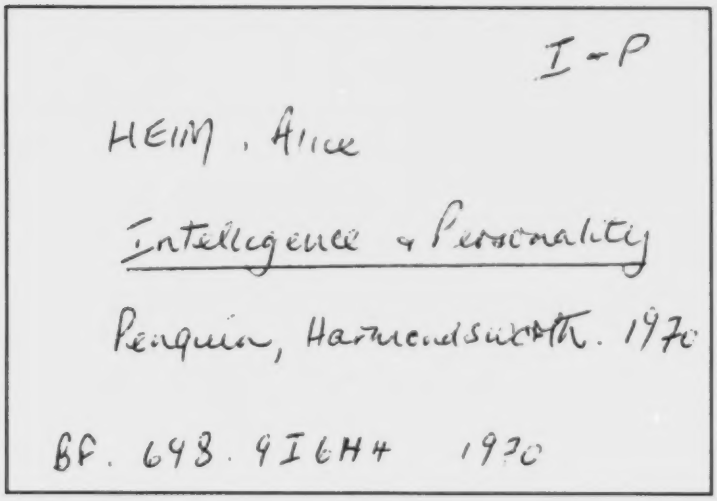
Many texts will require thorough reading, and certain writing styles will need more careful tracking. Whatever you are reading, it is important to keep a record of what you find interesting and possibly relevant to your topic. Interesting quotations, for example, can be key items and your own thoughts about what you are finding should not be overlooked. Get them down on paper!

A Note on Plagiarism: This occurs when students use ideas which they have found without indicating the source. Though this may sometimes be deliberate, this often happens as a result of poor record-keeping of information with regards to its source and summarization in your own words.

Opinions differ about how to record all the information which you collect at this stage. As with many aspects of learning strategies there is by no means a 'best' method, but some of the suggestions which students find useful are:

i) Using index cards.

For each book or article you locate, make a note on an index card. If you do this in proper bibliographic form, then it will be available any time you want to reference it. Adding the library call number will ensure easy access. The initials of the book will also help with indexing. On the back of the card you can record important ideas or interesting quotations that you will be able to reference.



ii) Keeping notes under different headings on $8\frac{1}{2}'' \times 11''$ paper.

A separate page can be allotted to each topic you plan to include in your draft. Thus, while reading one of the sources, any relevant piece of evidence or example can be described on the front of the sheet, while the details of the book title can be added on the back.

3. Planning a Point-Form Outline

Most students do not move quickly enough to this stage. It is taxing to consider all the ideas collected and devise the possible shape your final product might take. It is much easier to keep reading and recording what others have written. Many self-help books present this outlining stage as immediately preceeding the final product.

However, this notion underestimates how ideas begin to change and new ones 'crop up' once the process of assembling your thoughts is underway. This phenomenon has been described as 'thinking-through-writing' and makes the outlining phase even more of a challenge. So, although some writers claim that having an outline is very useful, others will acknowledge that they cannot predict the final structure until they have written up a few of their ideas. It may be helpful then, to refer to the 'Form of the Essay' on page 87 as you proceed to this phase.

It will also be useful to be familiar with word processing since this allows you to move ideas around without writing them out again. Since only one 'screenful' can be seen at a time the overall structure may be more difficult to monitor unless you print out a copy from time to time. This can also assist in making sure that editing is sufficiently ruthless. Be careful not to erase your working copy until you are sure that you have finished with it!

Being able to leave the rough outline you initially generate, for a day or so before you write up a first draft, can be very helpful in allowing ideas to 'percolate' before committing yourself to a particular thesis or point of view.

4. Drafting Your Essay

This is quite a challenge for it entails keeping a general theme in view while writing up different subsections. Suspending your critical self can help to keep a flow of ideas going, trusting that your earlier preparation has given you some ideas. You will have a chance to revise this and assess how convincing it sounds later. Your first version will be subject to change, so it is not as vital that each paragraph is complete as that the first statements and changes in topic be clearly set up.

At this point students sometimes report being 'blocked' or unable to make decisions about what to write next. Try not to attend to the final product but to let your ideas flow. You might even try talking them into a tape recorder before transcribing them.

5. Editing your Draft

When you read through your draft it is useful to have a few pointers in mind. Referring back to the original question or topic you could ask:

a) Does this answer the question?

b) Does the argument stop or move off at a tangent?

c) How are the main points arranged?

d) Have all of the main points gathered from reading been used? If not, why not?

e) Is there material which is not clearly attached to a main idea?

You might try getting help from a neutral reader at this point. When you have become very familiar with the topic it can be difficult to assess how quickly you can progress from one idea to another. Reading aloud to a friend can also be a way of weeding out unnecessary jargon. Check for linking sentences which clearly indicate when you move from one idea to another. These are crucial to the flow of your essay.

Often it is difficult to discard ideas which you have carefully collected, but if they do not add to your argument it is better to omit them. You may sometimes be rewarded for adding points which are not strictly relevant, but it is not a good policy to have the reader searching for your train of thought.

As you re-read you will have to consider how the paragraphs are helping to present your argument. Further information on this and on the introduction and conclusion is outlined to assist with your editing.

6. Final Presentation

The mechanics of your writing certainly play an important role in the overall effect of your essay. Given the availability of word processing facilities, this is also an aspect of essay writing which is changing. If you are not already using a word processor take every opportunity to learn.

Though jokes are made about getting higher grades for typed papers, the issue of legibility is not a minor detail. The general appearance and layout is very important, as is the matter of correct referencing and bibliographical notation.

There are many self help books available. They can help also as you compose, edit and polish your language.

Several useful sources are.

References

Messenger, William E., and Jan de Bruyn. *The Canadian Writers Handbook*. Scarborough: Prentice Hall, 1980.

Modern Language Association of America. *M.L.A. Handbook for Writers of Research Papers, Theses and Dissertations*. New York: M.L.A., 1977.

Northey, Margot, E. *Making Sense*. Toronto: Oxford University Press, 1983.

Northey, Margot, E., and Brian Timney. *Making Sense in Psychology and the Life Sciences*. Toronto: Oxford University Press, 1986.

Robertson, Hugh. *The Research Essay*. Ottawa: Longparish, 1985.

Stewart, Kay, and Marian Freeman. *Essay Writing For Canadian Students*. Scarborough: Prentice-Hall, 1981.

Strunk, W., Jr., and E.B. White. *The Elements of Style*. 2nd ed. Toronto: Collier Macmillan, 1972.

Turabian, Kate L. *A Manual for Writers of Term Papers, Theses and Dissertations*. 3rd ed. Chicago: University of Chicago Press, 1970.

PARAGRAPH STRUCTURE[1]

1. What is a Paragraph?

A paragraph is a group of sentences conveying a single unit of thought; that is, it presents and develops one idea only. The essay paragraph usually accomplishes these tasks:

(1) Makes an assertion (topic sentence)
(2) Explains the assertion (define, clarify)
(3) Provides evidence (details, examples, illustrations, or other types of proof)
(4) Comments on the significance of the evidence

The assertion or topic sentence generally appears at the beginning of each paragraph. It tells the reader the exact topic with which that paragraph deals. The rest of the paragraph is devoted to explaining what that assertion means, such as defining the terms or clarifying the situation, and then proving the truth of the assertion. Further, the writer may want to explain the significance of the proof to his reader, to be sure that the reader understands why these particular kinds of proof were chosen, and to allow him to judge the validity of the assertion.

SAMPLE PARAGRAPH

Topic Sentence	What seems "natural", common, and harmless in the film *Psycho* actually becomes horrid and dangerous. That is, the central feature of the story — the innocent-looking young man,
Explanation	the quiet country setting, the opening detective story plot–all mislead the viewer to expect a tale about two bandit-lovers on the run. Instead, the countryside becomes a burial plot and the film records the twisted logic of a psychologically disturbed, lonesome young man. The money, for example, would
Examples	ordinarily constitute the object of a vast search, but in *Psycho*, this money becomes unimportant to the examination of the labyrinthine ways of a psychotic mind. And the common act of taking a shower becomes a horror and a disaster for the young woman as well as for the robbery caper in which she
Explain meaning of the point of the paragraph	is involved. One of Hitchcock's purposes is thus to bring the audience to sense the unexpected possibilities of disaster in our everyday routines.

[1] From materials by Maureen Bogdanovich, Mount Royal College, Alberta

2. More About Introductions

The introduction provides your essay with direction and interest. The reader will want to know where she/he is going and what to expect. It can provide preliminary information or background observations about the subject under discussion. It sets the tone for the paper. But, generally, it should accomplish three functions:

a) announce the subject

b) interest the reader (by using apt illustrations, factors or examples — or by explaining the significance of the subject)

c) state the thesis clearly and concisely

Introductions may extend to two or three paragraphs or even two or three pages, depending on the length of the essay. Most often, a paper under 8,000 words long contains one or, at the most, two paragraphs for an introduction. The main structure of the introduction, no matter how long, is to begin with a broad view of the subject and then to narrow down to the point of your essay, the thesis statement. Generally speaking, keep your introduction as short as possible.

SAMPLE INTRODUCTORY PARAGRAPH

The Thesis:	***Changing perceptions through time on masculinity, and resultant behaviour changes.***
General Statement	What has happened to the American male? For a long time, he seemed utterly confident of his manhood, sure of his masculine role in society, easy and definite in his sense of sexual identity.
Examples – Development of Interest	The frontiersmen, of James Fenimore Cooper for example, never had any concerns about masculinity; they were men, and it did not occur to them to think twice about it. But one begins to detect a new theme emerging in twentieth century literature: the theme of the male hero increasingly preoccupied with proving his virility to himself. Today men are more and more conscious of maleness not as a fact, but as a problem.
Thesis Statement	There are multiplying signs indeed, that something has gone badly wrong with the American male's conception of himself.

3. Conclusions

The concluding paragraph focuses the reader's attention on the purpose, thesis, and subject once again. The paragraph begins with an altered or extended statement of the thesis,and then traces the implications or consequences of the idea outwardly to broader applications. It should accomplish the following functions:

- remind the reader of the main subject and purpose
- explore the greater implications and general significance of the subject
- convince the reader of the subject's value

Several ways of ending an essay convey a sense of finality:

a) summary of ideas with suggestions for further study
b) personal evaluation of the presented idea
c) appropriate quotation and comment about its significance
d) extension of thesis into larger truth or universal consideration

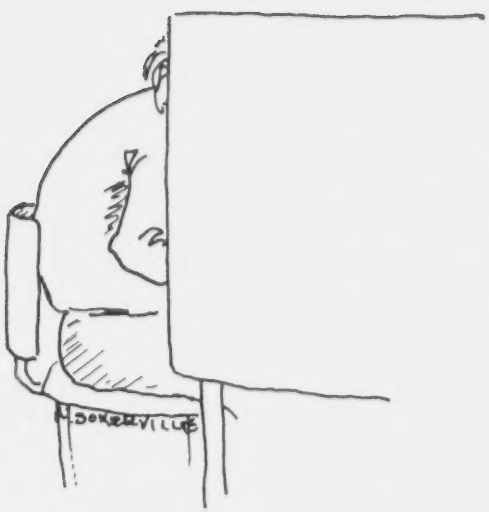
Naturally, you will not use all of the above methods in a single conclusion; choose the method that seems appropriate to the subject of your paper. The basic principle is to restate the thesis, and then end the paper gracefully without introducing new material. Proportion the length of the conclusion to fit the length of the whole essay. A short paper will require only one paragraph; in a long paper you may wish to restate your thesis in one paragraph, fully summarize your arguments briefly in a second paragraph, and discuss the significance of your argument in a third. Keep your conclusion as short as possible, depending on the length of your paper.

SAMPLE CONCLUSION PARAGRAPH

Original thesis was as follows:	***D.H. Lawrence's explicit view of the place of women contrast with his characterization of Mrs. Morel and Lady Chatterly.***
Concluding Statement	The characterizations of Mrs. Morel and Lady Chatterly, therefore, seems to contrast with Lawrence's directly stated opinions about the relationship between men and women.
Thesis Restatement and Extention of Idea	Perhaps Lawrence unwittingly is revealing the strange dichotomy most men hold subconsciously about their women, believing rationally that women have a right to individuality but preferring them to maintain a subordinate and inferior position. If so, this unconscious desire could help explain
General Comment	the widely evident discrimination against women in jobs, in salaries, and in status.

9. PREPARING FOR EXAMS

- Student comments on exams
- Where do you start?
- Important steps in exam preparation
- The final exam period
- Worried about exams?



STUDENT COMMENTS ON EXAMS

Read the list of statements on exams that have been made by students and for each one decide if this generally applies to you or not. Put a check mark by those that do. In each case, is your answer what you think ought to apply? Add four observations of your own about exams.

1. To get down to studying for exams I have to be in the right mood.
2. I know exactly what each of my tests is worth.
3. I don't really know how much time I should spend studying for exams.
4. If I try to plan an exam study schedule, it ends up taking a lot of potential study time.
5. It is difficult to limit the amount of study time I spend preparing for exams.
6. I tend to skip the last class before exams so that I can study.
7. Reading the text is the best preparation for any test.
8. Multiple choice exams are tricky.
9. You don't need to know as much to answer multiple choice exams.
10. I always do better on essay questions.
11. I try to begin writing as soon as possible in an exam.
12. Exams give me a chance to really understand the course.
13. I like to make study notes and put all the important information together.
14. I learn much better if I work in a study group.
15. _____
16. _____
17. _____
18. _____

WHERE DO YOU START?

Kevin is keen on history and would like to major in it eventually. He spends a lot of time each week reading both the text and additional readings. He takes summary notes as he reads and is confident of having a good grasp of the major topics for this test.

Linda has been swamped this last month with two major assignments to complete. Last week she was sick for three days and missed several classes including history. She likes the subject but hasn't put in a lot of time and is worried about this test.

Reflect on this situation where these two students have to write a history test in three days. From the brief case studies you can see that there is a big difference in where each will be starting the review process. Kevin already has covered a lot more of the basic information and will be able to spend time reviewing material that he has studied before. Linda, on the other hand, will probably have to do a lot of reading for the first time.

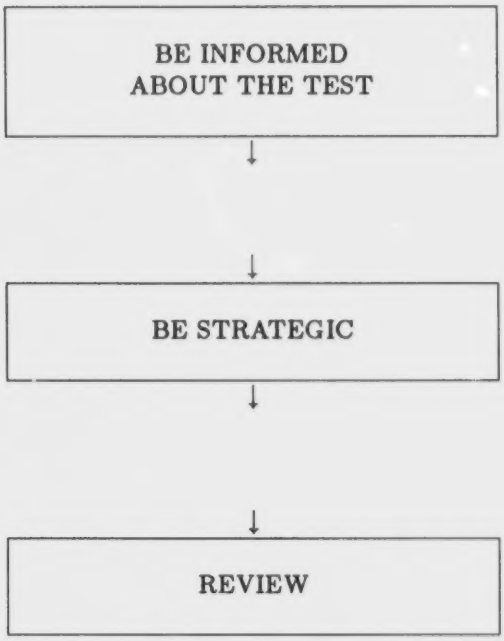
Any discussion of the review process must attend to this basic fact that not all students are equally prepared. Ideally review should be just that — 'review' of information studied before. In our work with students, however, it is not uncommon to find students for whom review means studying new information. If this is the case then review becomes a real challenge.

Goals for the review process will be the same for all students, regardless of background. They are:

1. To understand key concepts and important details.
2. To have good memory of the course content, and the ability to recall readily relevant information.
3. To know the requirements of typical test questions and be able to apply information in an appropriate manner.

IMPORTANT STEPS IN EXAM PREPARATION

Step 1.



Step 1. Be Informed About the Test

Good students take responsibility for finding out as much as possible about a test, and so some of the following questions may seem like common sense to those of you who do pick up as many cues as possible. However not all students are good 'cue seekers' and that can have a really negative effect on performance. For any test, you will need to keep in mind other commitments that you have and therefore the amount of time you can reasonably expect for review.

If possible, for the following questions, link them to the next test that you have:

1. When, where and how long is the test?

---

2. What format will be used?

---

3. What topic areas will be covered? Are they from lectures, readings, labs, seminars, etc?

---

4. What special interests of the professor might influence the topics, format etc?

---

5. Are any old exams or model questions available for practice?

---

6. What resources are available for help during the review process — professors, teaching assistants,other students, help centre?

---

7. What percentage of the final mark is this test worth?

---

8. What mark do you realistically aim for?

Step 2. Be Strategic

It is really important to plan your strategy of attack for review, whether you are beginning from a good base or not. There will be differences among students. For example, someone who begins well prepared can spend much more time practising the application of information to sample questions; whereas a student who has a lot of basic make-up work to do will need to fill in missing information. Some points and questions to keep in mind might be:

1. ***Set targets*** in terms of content to be completed by certain dates. Setting up a plan seems to motivate many students by giving them measurable goals to aim for.
2. ***Decide where to work***. Avoid settings with obvious distractions. Also choose a place well away from interruptions from friends.
3. ***Begin with content that you find most difficult***. This task in itself is difficult for some students and they have to seriously consider which topics these are.

You may need to get help during the review process if you are unclear on concepts.

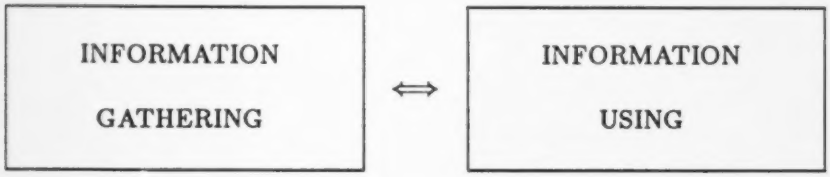
4. *Plan the order in which you will go through the content.* This may be tied to the cues that you identified. It is not uncommon for the heaviest weight to be given to recently completed topics, and so these should get special attention.

5. If you do not have time to study everything then it is better to *know a selection really well rather than everything inadequately.* Target sections that you think will pay off most if that is possible.

6. How are you going to *evaluate the quality of your review*? Do you have ways to self test and evaluate your progress?

7. Are you going to study alone or with other students, and how can this be organized? *Group study can be effective* if there is a clear agenda for such meetings.

Step 3. Review



This step involves the coordination of two important activities. A student will switch from information gathering to information using and back again many times throughout the review process.

INFORMATION GATHERING involves reading through the sources of information for the course. Class notes are usually of prime importance as it is in the lectures that professors highlight key concepts. Many students make the mistake of not using class notes and depending largely on the text.

The text is also an important source of information, as are your lab notes, essays, old exams, handouts, — in fact all of the materials that constitute the course. Ideally the text has been summarized either through highlighting or as summary notes, and a student does not then have to reread everything.

INFORMATION USING allows you to test your understanding of the concepts. As you review you need to apply information in a variety of ways and especially to create situations where you will *rehearse the test situation*. Try some of the following:

1. *Make study notes*. Outline key information by selecting important concepts.

2. *Generate new examples* to illustrate concepts.

3. *Predict questions* that may be on the exam.

4. When you think you know the information, close your books and *write or recite key information from memory*.

5. If you have an old exam available, you can '*rehearse*' the whole exam by using it as a trial run. Don't leave this until the last night before the exam.

6. If you are being tested through problems, as in science and economics for example, *spend a lot of time doing problems*.

   Also — very important — review the concepts and then close your books and do the problems. You need to practice in as realistic a setting as possible, where you are drawing on memory only. This is good rehearsal for the exam. Give yourself a reasonable time limit for each question and if you get stuck go on to the next question.

7. If you are being tested through essays, again *rehearse the exam by writing short essays*. Too many students make the mistake of only reading for review when the test requires writing. Get used to recalling from memory and writing in a logical, coherent, concise manner.

8. Make up *mnemonics* for difficult-to-remember information.

Review therefore can be seen as a two-step process, with the student interchanging the two steps throughout the review period. These two steps are:

1. gathering in information from external sources, such as notes and text.

2. producing information by recalling from memory and self testing. It is this production of information that is required for exams and that is why it is such a critical component of review.

THE FINAL EXAM PERIOD

Final exams present special demands because often a student is studying for several courses over a limited time period. This involves assessing the total picture and making some major decisions on when, and how long, to study each course.

Try to avoid the major trap of overstudying for the first exams, and then running out of time and energy for the later ones. Much will depend on how the exams are spaced. Can you answer the following questions?

1. How many exams do you have and when are they? Mark the dates on the calendar on the next page and see how they are spaced.
2. What course content does each exam cover?
3. What is the format for each?
4. What percentage of the final grade is each?
5. In terms of amount study time required, can you rank each in terms of: 1. a lot 2. average 3. little.

Courses	Material covered	Format	% of final grade	Rank

MARCH

S	M	T	W	T	F	S

APRIL

S	M	T	W	T	F	S

MAY

S	M	T	W	T	F	S

WORRIED ABOUT EXAMS?

1. John is worried about a major exam he has to take tomorrow morning at 8:30 a.m. He sets his alarm to get up at 5:30 so he will have an extra 2 hours to read one more chapter. *Will he be spending his time in the best way?*

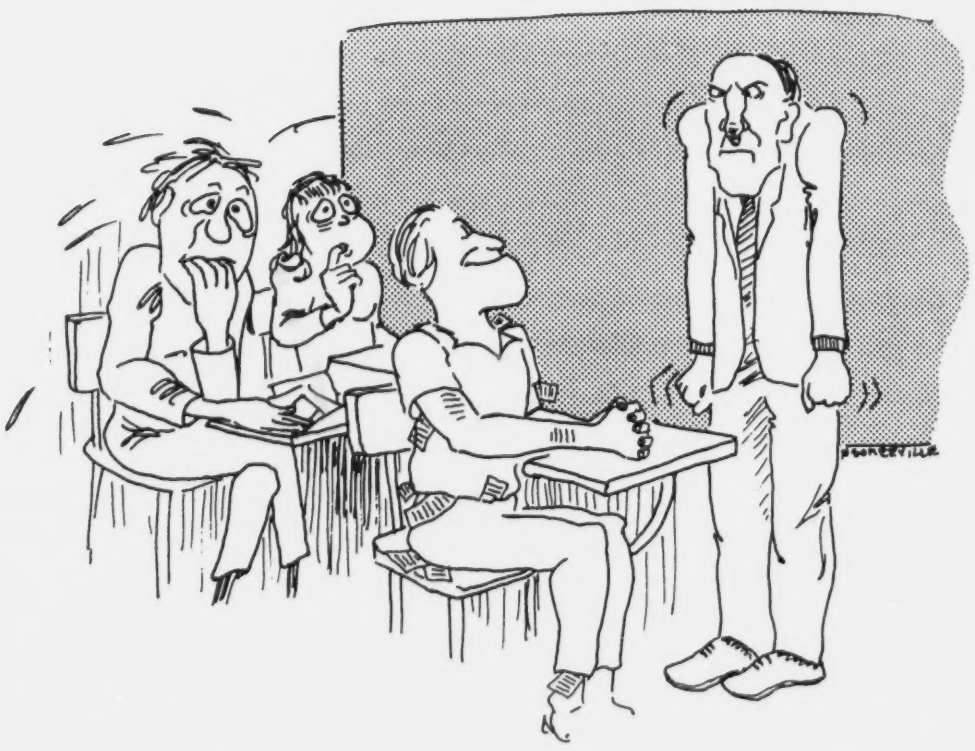
2. Joan has a 15% term test in her 9:30 class and would like some more review time. The professor in her 8:30 class is returning a major exam which he plans to discuss with the class. Joan decides to skip her 8:30 class to review for the 9:30 test. *Has she made the best decision?*

3. Mark is proud of his notes taken in Psychology 020. He plans to spend 5 hours reviewing them to ensure a high mark. His friend, Les, has just phoned him and wants to review with him. Mark accepts. *Should he have done so?*

4. Kate knows that she has difficulty in exams in recalling key points. *How can her review be organized so that she does this more easily?*

10. WRITING EXAMS

- Multiple choice exams
- Essay questions in examinations
- Problem solving exams
- Test anxiety — Good or Bad?



There are many types of exam question formats, for example: multiple choice, essay, problem solving, short answer, true/false, matching pairs, fill in the blanks etc. Each type of question presents demands for the student who must devise matching strategies. In this chapter we will examine stategies for three commonly used formats:

1. multiple choice
2. essay
3. problem solving

MULTIPLE CHOICE EXAMS

Students vary a lot in their response to being tested through multiple choice exams. Some report that they prefer them to essay exams because there is less anxiety, with the question stimulating considerable recall. It seems that comfort is obtained from knowing that the right answer is on the paper and thus there is less danger of 'going blank'.

Other students are very fearful of multiple choice exams. They report that the questions are 'tricky', out to catch you, and that it is impossible to choose between at least two seemingly right answers. It is not uncommon for a student to say, "I really knew my stuff, but I had such a hard time with those answers. The mark that I got does not reflect what I knew." Once a student begins to think this way then high levels of anxiety can make future exams an even more difficult ordeal to face.

In our work with students we do a lot of 'error analysis' with multiple choice exams. This involves working closely with a student, getting him/her to re-process questions answered incorrectly on the exam, and also checking source materials such as the text, lecture notes and exam study notes used by the student for review. We work together to answer the following important question.

Why Do Students Get Questions Wrong on Multiple Choice Exams?

1. *IN EXAM ERRORS*

In this situation *the student does know the content* and can process the question accurately, but this did not happen in the exam. Some reasons for this may be:

- ***Anxiety*** interferes with thought processes causing confused or impoverished thinking.
- The student may be trying to ***speed*** through the exam, not allowing for adequate time to think carefully.
- ***Mistakes*** can be made in the mental representation of ideas. The student may not properly interpret some of the statements.
- The student may have ***inefficient test taking strategies***, that is, the overall approach to answering questions may lead to problems. An effective strategy is described later in this chapter.

2. *PREPARATION PROBLEMS*

The student does not know enough accurate information to answer the question. The most usual reasons for this are:

- *Too little time spent in review*. Some students are either so busy with other activities, such as a job, sports, or social activities, that studies really suffer. It may take some negative feedback through poor test scores for a student to re-evaluate priorities and allot more time to study. However, one should be very careful about automatically assuming that the problem is quantity of time spent studying. Poor results are often more a problem of quality of studying, or inappropriate choice of course.
- *Incomplete or inaccurate information*. Sometimes students are correct when they report that they really know their stuff. However, evaluation of their class notes from which they have studied can typically reveal severe underlying problems of poor note-taking. If a student takes poor quality notes in class, then that is a real impediment to further learning. Another problem may be that a student has difficulty arriving at full understanding of basic concepts. This is a difficult problem for a student, as poor exam results may be the first indication that he/she are on the wrong track.

- *Ineffective review techniques.* Many students review by reading and re-reading their lecture notes and highlighted text. This is an ineffective way to review for most exams. Effective review involves the use of active learning strategies including: attention to headings, summarizing key points using a selection framework and reciting summaries using the headings as cues.
- *Inappropriate products of learning.* A student may have memorized by rote instead of by understanding the ideas. Although some questions on an exam may require straight recall, many go beyond this. In particular, students who do poorly may have problems with:
  1. applying concepts to a variety of examples.
  2. making inferences from basic information.
  3. transferring concepts to new contexts.

CONCLUSION

There is no quick fix for students who experience preparation problems for exams. They may need to re-evaluate themselves in terms of *the good strategy user* and work to improve their overall approaches to learning. At this point we will turn to the strategies used within the exam itself by asking the question, "how can students, who really know their course content, reduce in-exam errors?" The answer suggests two possible approaches:

1. Process questions systematically.
2. Stay calm — practice stress-management techniques.

A System for Answering Multiple Choice Exams

1. *COVER UP THE ALTERNATIVES*

It is too easy to fall into the trap of reading everything very quickly before carefully reading the question. There are two dangers here. The first is that a student can become overwhelmed by the quantity of information to be processed and can panic. Secondly, much of the information that is to be processed is in the form of incorrect statements. These can interfere with existing knowledge and leave the reader confused. Use a computer card or a ruler to cover up the alternatives while reading and processing the question.

2. *READ THE QUESTION*

First of all read to get a general idea of what the question is asking. If a question is very short, you may be able to arrive at a complete understanding

with the first reading. However, with longer questions, the first reading may result in a general understanding of the type of question, and a student will need to go back to re-process the question again.

3. *PROCESS THE QUESTION*

This is the crucial step of arriving at a precise and accurate understanding of the question. Depending on the level of difficulty you may need to:

- underline key words
- name the *concept* from which the question is derived
- rephrase (translate) the question into your own words

caveat — This is where many problems begin, with insufficient care applied to decoding the question.

4. *PREDICT A POSSIBLE ANSWER*

This will be possible if the question is complete in itself, and you are able to recall the appropriate information from long-term memory. Even if a question is incomplete without the alternatives, recall that general content area and especially identify the concept with some of its associated key ideas.

caveat — This is another major stumbling block. Many students do not make use of the knowledge they have. There can be a tendency to believe that the correct answer will "hit you in the eye" as you look at the alternatives. This is not so — you need actively to recall the relevant information.

5. *CHECK THE FORMAT OF THE QUESTION*

In some questions there are combination answers, such as: both a) and b); all of the above; none of the above. You need this information to guide your reading of the alternatives. You will need to know whether you can respond positively to more than one of the alternatives.

6. *PROCESS EACH OF THE ALTERNATIVES*

Read each of the alternatives for meaning, not just to recognize familiar terms or phrases. Essentially, each alternative is a true/false statement about the question, and you need to respond in each case with:

$\surd$ — I think this is true

$\times$ — I think this is false

? — I'm not sure at this time

caveat — There are some pitfalls for unwary students with this step. Although exams will vary from professor to professor there are some pitfalls that seem common to many. Do not get trapped by:

- *Jargon*
  Sophisticated terms catch students. They often report that a word or phrase that sounds impressive must be correct, even if in fact it is a nonsense phrase made up by the professor.
- *Familiar phrases from the course*
  Students who 'recognize' rather than thinking through an answer may get caught by a phrase out of context.
- *Correct statements learned in the course, but not answering the question*
  If a student loses contact with the question, it is very easy to fall into this trap.
- *Logically correct statement that is part of your general knowledge*
  A good example might be in a course such as Child Development. People carry around a lot of general knowledge about children. Some of that knowledge may be in the form of 'myths' when measured against experimental studies. Professors know these myths and may build them into a test question to identify the unprepared student.

7. *IDENTIFY THE CORRECT RESPONSE*

If you understand and have a good memory of course content, and have processed the question and the alternatives correctly, then the next step is to circle the correct response. However, life is not always so simple, and there may be a need for some backup strategies.

8. *RE-READ THE QUESTION*

This might be where the problem lies. If not, it still makes sense to re-read, as there will have been a lot of processing since that first reading.

9. *ELIMINATE WRONG ANSWERS*

If you still have problems with the question, try to reduce the number of alternatives by eliminating any that seem to be obviously incorrect choices.

10. *GUESS*

This is the last resort when all else fails, and only to be used if there is no penalty for incorrect responses. With all the processing that has occurred, this will be an educated guess rather than a stab in the dark!

SAMPLE MULTIPLE CHOICE QUESTIONS

Each of the following questions[1] has been chosen to illustrate specific points. The correct answers are indicated by arrows.

1. If a wolf or dog rolls onto its back like a puppy, we are probably witnessing

   a) a threat display
   b) a sexual display
   c) ritualized combat
   ⟶ d) an appeasment display

This is a very straight forward question and, in the course where it was used, was an example straight from the text. This question is complete in itself and a well prepared student would be able to recall *appeasement* as the concept illustrated by this example. Note that the concept is in the alternatives while the question itself is an example.

2. Psychologists have often pointed to the similarity between territoriality in animals and personal space in humans. Available information suggests that personal space patterns in humans

   a) are instinctively determined in much the same way as in other animals
   ⟶ b) are probably more a function of cultural and social factors than genetic determinants
   c) are very similar across cultures and societies
   d) are as predictable and automatic in humans as are territorial patterns in other animals

This is in many ways similar to question 1, but there is quite a bit more reading. Here the concept of *territoriality* or *personal space* is up front in the question, while the answer is only one of many non-controversial details that one would know about this concept. Because there is a number of things one would know about this concept it is not possible to predict the answer. However, it is important to define the concept and to recall some relevant information before reading the alternatives.

3. The 'cupboard theory' holds that mother-infant attachment is based primarily on fear of losing the individual that satisfies the infant's bodily needs. Which of the following observations, if true, would *support* such a theory?

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[1] Reprinted with permission of the Psychology Department, U.W.O.

a) even when well cared for, children display intense separation anxiety upon separation from the mother
b) children often display attachments to individuals who have not been caretakers
⟶ c) infant monkeys form the strongest attachments to surrogate mothers that supply food, regardless of the physical characteristics of the surrogate
d) there appears to be no reliable difference in the quality of attachment of a human child to mother or father, no matter which of these is the primary caretaker

This is a question containing a precise definition of a theory. It requires knowledge of the 'evidence' in support of this theory. The main pitfalls in this question are the true statements that do not answer the question. All three of the incorrect responses are true in many instances. With such a question it is essential to separate general knowledge from course specific knowledge, and to keep close track of the question.

4. Suppose you lived in a culture in which people tended to be ashamed and confused about eating rather than sex. Such people might cover their faces and express shock at the sight of another person's lips. They might also limit their intake of food to unappetizing pellets hurriedly consumed behind the locked doors of small private cubicles. In such a society, which of the following statements would be most likely to be uttered by a person displaying projection, as defined by Freud?

a) "As an artist I am best known for my portrayals of pineapples and swiss chard."
⟶ b) "I always notice Edith's devouring eyes."
c) "Sure I subscribe to *Gourmet* magazine. Its articles on current events are excellent."
d) "Yesterday I saw a truly disgusting sight — a huge roast turkey awash with rich brown gravy and cranberry sauce sitting beside a juicy apple pie. I tell you, it just about made me sick."
e) "I was so angry with my Dad last night, I called him a "baked potato" right to his face."

In this question the examinee is being tested through an analogy. The concept of ***projection*** is applied in a completely new context for the student. Again, an essential ingredient to success is the student's ability to both identify and define the underlying concept.

ESSAY QUESTIONS IN EXAMINATIONS

Writing an essay within a short time frame (usually less than an hour) is a very different activity from composing a research essay. Usually the objective here is to demonstate to the examiner that you have a certain amount knowledge of the course material. Thus, most students are potentially using the same 'data base' of memory, and the major skill required is the ability to answer the question succinctly, bearing in mind key priorities of the course content.

This sounds easier than it is , and even though for many students this may be a difficult task, yet it is unlikely that many students practice this activity outside of the times that they are obliged to do so. Just as any sports performance would suffer from lack of training, so do the efforts of many a student to produce a brief, but comprehensive analysis of an essay question.

Common Problems with Essay Exams

Faults which are often criticized are:

1. Not analysing the question carefully enough to decide what key issues are involved. In other words – not answering the question.

2. Not making it clear how the essay will proceed, especially as regards overall theme. That is, there is no guiding information for the reader.

3. Not attending to how each piece of information fits with the introduction, so that the end product lacks organization and relevancy.

4. Not using the vocabulary that is specific to the discipline. The language is that of every-day conversation rather than at an academic level.

5. Not giving specific examples to illustrate general comments that you make. It is the use of appropriate examples that really confirms knowledge of a concept.

Each of these problems can be related more to the need for giving some thought to the topic than to a lack of content information. Within the time limits of an exam, attending to these problems can require deliberate planning. It is hard to survey the questions, make a reasoned choice, and plan a time frame for your answers while your colleagues are already scribbling furiously, but these three steps are a fairly safe bet for improved results.

Effective Strategies to Try

1. As you read through the questions, jot down a few words and phrases. This will cue you to how easy or how difficult it is to recall relevant information for that question.
2. Look through the comments that you jotted down. This will help you to choose which question to answer.
3. Make your decision, and allot the time available for each essay — leaving a few minutes at the end of the exam for a final review.
4. Plan a point-form outline for each question consisting of:
    1. a re-statement of the question
    2. The points of the content to be considered in order (ideally one to each paragraph)
    3. the main point you wish to make, along with any source or name you wish to quote.

    This is something that you can practice with one or two colleagues before the test. If you set up a few questions for each other and try to make such outlines (say four in an hour), then you can compare notes. This will improve your knowledge, as well as raise the level of your skill in planning exam answers.
5. Write your essay in a standard format (see chapter 9: WRITING RESEARCH AND OTHER ESSAYS). Remember that you are writing for someone else to read and so your handwriting needs to be as legible as possible. If there is a problem, write on every other line. Also number your questions clearly in the margin as it is very frustrating for the marker to have to search for the beginning of your essay.
6. Finish on a positive note, even if you have doubts about having done justice to the topic.
7. When you finish the exam, if you allow some time to read over your answers to check for spelling and legibility, you may be rewarded by your reader for making the reading of your essay a more enjoyable experience.

TERMS COMMONLY USED IN QUESTIONS

1.

> COMPARE AND CONTRAST significant aspects of the role of the President in the U.S with that of the Prime Minister in Canada.

Students will recognize 'compare and contrast' as one of the most widely used phrases in exam questions. It is also one that is often poorly handled. It requires that points related to similarities and differences be discussed. A common problem is for students to write everything they know on the President, followed by everything they know about the Prime Minister. That is not acceptable and a student must attempt an integrated discussion throughout the paper.

2.

> ANALYSE THE SIGNIFICANCE of Canada's natural waterways to the early settlement of the country.

This calls for something beyond a simple descriptive inventory of this aspect of Canadian geography. A student would need to discuss important concepts such as barriers, natural routeways and their potential hinterlands, resources, trade and politics.

3.

> CRITICALLY EXAMINE the role of United Nations peace keeping forces from 1970 to the present day.

This type of question requires hard evidence for points that are made. The student would need facts, and would have to evaluate real causes,events and consequenses, as well as generating hypotheses of other possible outcomes.

These three commonly used terms are examples of a whole range of vocabulary used on exams. What is your understanding of the requirements for the following terms?

assess	describe	explain	justify
argue	discuss	evaluate	predict
define	examine	illustrate	prove

PROBLEM SOLVING EXAMS

The third type of exam format is that of the problem solving exam, in which you must make logical decisions that lead to a correct answer e.g. mathematics, physics etc. As with any exam format it is worthwhile to use some problem solving exam strategies. The strategies presented here are intended to help you avoid some of the more common errors that students make when writing problem solving exams.

1. **Budget time to marks**. Many students get 'hung up' on problems that are not worth very much. To avoid this, check the marks' distribution at the start of the exam so that you can pace yourself appropriately.

2. **Read over all the problems first**. This strategy has two important advantages over just 'jumping in' to solve problems. First, you can decide which questions are easier for you and second, difficult problems can incubate in your brain while you do the easier problems. *caveat* — Only use this strategy if reading over the exam does not make you nervous.

3. **Start with the easier questions**. Often certain types of problems seem easier to you than others. By reading over the exam (or a few of the initial questions) and then starting with one of these easier problems, you can build your confidence as you write the exam. Also, you are ensuring that you are doing the problems you know how to do before tackling the more difficult ones.

4. **Minimize 'dumb' mistakes**. Here are two suggestions for lowering the frequency of these annoying problems:

   a) Practice writing neatly and one step at a time. So many errors are caused by not following these guidelines, both when studying and in the exam.

   b) Monitor the 'dumb' mistakes you make while studying. Some mistakes occur in the context of the problem types. By noticing that you seem to make errors in specific types of problems when you study you can be on the alert for these on the exam.

TEST ANXIETY — GOOD OR BAD?

Many students report that they feel tense before an exam and there is evidence that 15% of all students do less well because they cannot control their emotional response to being tested. The exam result therefore, may not reflect their ability, or the amount of preparation they have done, or coincide with their standard on term work, assignments or essays in a course.

Symptoms of tension such as stomache upsets, headaches, or rapid heart beating can be so distracting that it becomes difficult to focus on the task at hand (i.e. analyzing the questions on the exam). Worry thoughts can interfere with the attention required to deal with the exam. Such thoughts as, "if only I had prepared better ... this test is going to be too difficult ... what if I mess up like last time?", can take priority and in extreme cases result in a situation where a student goes blank, and is unable to start the exam.

Not all anxiety is negative however. Being 'keyed up' can help gather up the energy needed to achieve concentration and be able to work through an exam paper. Research indicates that those students who are moderately nervous achieve best results.

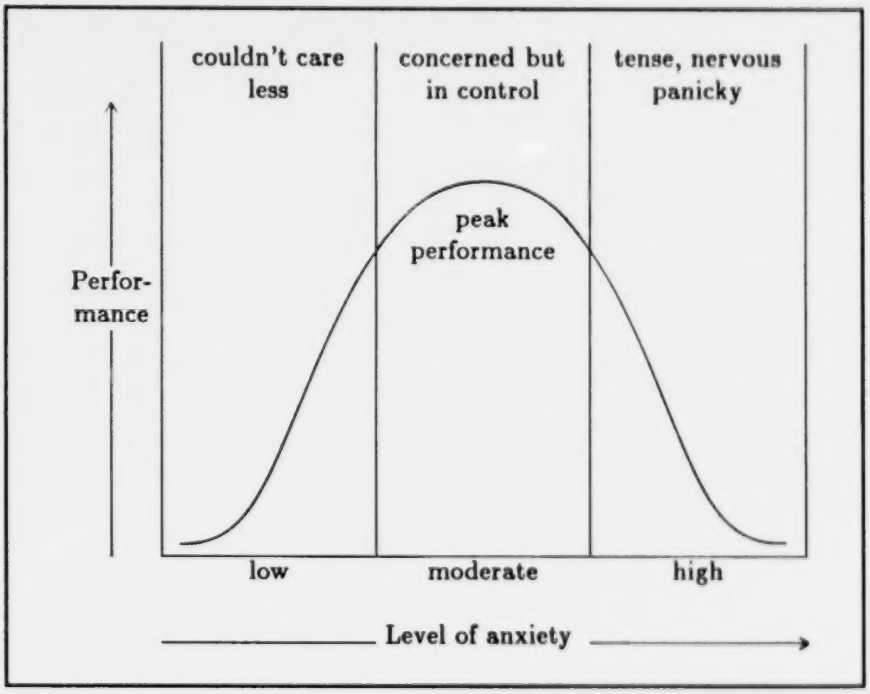

Figure 10.1 Relationship between anxiety and test performance.

Controlling Anxiety

If your potential level of anxiety on a test is very high, you should check with a counsellor. There are techniques which seem to help many people, but they are not a last minute fix. Try to plan well ahead to get some help with his problem.

Students at college and university write many tests before they graduate. It is necessary to keep these tests in perspective and to try to see them as steps on the ladder to success, rather than as potential stumbling blocks. Most students feel some natural anxiety and may need to practice conscious strategies to control the situation.

ON THE DAY OF THE TEST — BEFORE THE EXAM

1. ***Be as well rested as possible*** before taking a test. A sound night's sleep is essential to good performance for most students. 'All nighters', or studying until the very last moment, are risky.

2. ***Know exactly where the exam room is***, what time the exam begins, and as much about what to expect of the exam setting as possible.

3. ***Get there in good time for the exam*** but don't be so early that you have to wait around. Avoid discussing content with other students. Its likely that you will begin to panic if you suspect they know more than you do.

4. Some students like to ***take along a lucky charm*** — a favourite sweater, pack of gum, picture of your best friend, or rabbit's foot!

IN THE EXAM ITSELF

5. ***Take some deep breaths*** as you go into the exam room, choose your seat and look through the paper.

6. Try to monitor signs of physical tension. ***Stretch some muscles*** if you sense that you are tense. Don't be shy, lots of people stretch legs, arms, fingers in exams.

7. ***Use visual imagery*** to calm yourself down. Close your eyes and 'see' yourself writing the exam and doing really well — suitably relaxed etc.

8. ***Focus on positive thoughts*** rather than negative. There is a lot of evidence to suggest that we have a lot of personal control through our 'inner talk' with ourselves. There are three pointers about such conversations:

- **Focus on yourself**. Don't get involved in watching other students in the exam, or worrying about how they are doing. You have no control over them and worrying is a waste of time.
- **Focus on the here and now**. Don't think of past mistakes or bad experiences on exams. Also, don't think of all the future plans that depend on your performance. Worrying about getting into graduate school won't help you on this exam.
- **Focus on the exam itself and what it means**. The exam is testing your knowledge of a limited set of information at a certain point in your own personal history. Try not to overgeneralize on what the exam means with statements such as, "if I can't do this, I must be dumb" or, "I'll never get anywhere at this rate".

9. Don't be afraid to stop and *take a break* during a test, especially if you regularly do that when you study.
10. *Plan a treat for after the test*. Meet a friend, watch T.V., or go to a movie. This will give you something to look forward to as you write the test.

A more extensive discussion of monitoring thoughts to control exam anxiety is available in: Grassick, P. (1983), *Making the Grade*, Toronto: Macmillan.

CAN YOU ADVISE?

1. Matthew turns the first page of the multiple choice exam paper and begins to panic as all of the questions are from the chapter that he did not have time to read. *What can he do to stay calm?*

2. Jenny is just about to begin the last essay question worth 20% of the exam. She looks up to check the time and finds that she only has 5 minutes left. *What can she do in 5 minutes?*

3. Mike is about to write a history question on twentieth century Canada. He knows so much about this topic that he doesn't know where to begin. *What should he do?*

4. Paula is feeling tired. She studied really late last night for this test, and she can hardly keep her eyes open. *What can she do to improve her energy and concentration levels?*

APPENDIX

GUIDE TO TEACHERS AND COUNSELLORS

Throughout this book we have introduced both learning strategies and ways in which students can develop their awareness of strategy use. Some of these approaches *entail setting and managing an environment* that is conducive to good studying while others are *cognitive strategies to engage the mind* more effectively in understanding a certain topic.

The emphasis on a student's ability to monitor his/her own strategy use reflects recent findings on *metacognition* as an important component in the learning process. This term describes both knowledge of one's own learning as well as an ability to regulate it. Metacognition is, therefore, the newer emphasis in the book and there is still debate about when and how students can acquire this kind of knowledge. This book suggests that teaching a specific technique, a traditional practice in education, has to be accompanied by explanation of how and when such a technique is appropriate.

Encouraging students to make such metacognitive decisions can certainly produce a diversity of student responses which may be difficult to handle in a large class. However, if learners are to gain a measure of autonomy which then permits them to choose strategies which help them to adapt to new situations, courses, and assignments, this is what we are advocating. You will have already noticed that capable students do come up with differing ideas. As a teacher you might see if they suggest useful strategies which could be presented to other students in your classes.

In practice, those schools which are building learning skills into the curriculum have found that:

a) it is desireable to introduce strategies or skills that have been commonly agreed upon by a group of staff members.

b) instruction on learning skills should be organized to teach one strategy at a time. This can be reinforced in several classes.

c) such new information is better presented by subject teachers who can use relevant and interesting examples which are intrinsic to the subject content. This is preferable to introducing learning skills as an adjunct activity or in a special class.

d) credit has to be given in testing for a student's ability to demonstrate knowledge of the process as well as the product of the learning task. For example, the decision steps of a science problem (as described in Chapter 7: SCIENCE PROBLEM SOLVING) are as important as the computations themselves.

It has also been observed that the introduction of learning skills takes some time away from content teaching and therefore is not always easy to 'sell' to students. Some students do not attribute success to this kind of effort and are loathe to do 'extra' work which requires such attention to process. There are a few ideas which may involve students more actively in strategy development.

1. *The Coaching Analogy*

Certain students who play or watch sports will identify with the idea of being trained to perform better through special coaching. They can recognize the value of specific practice, regular workouts and acquiring the knowledge necessary to developing certain skills. Unfortunately it is much harder to show them a good thinker than a good athlete but the comparison can be made.

2. *Case Studies*

The notion that a change in approach will be useful can be highlighted more easily through specific examples such as case studies. Examples of typical case studies are at the end of certain chapters in this book. Students are often prepared to make comments on the strategies of others more readily than to comment on their own situation. Questioning which redirects the issue to the students' experiences can be an effective way of raising their awareness. Additonal examples of case studies are given in the following worksheets. You will be able to devise others which illustrate the problems you can see in your classroom.

3. *Exploration of Student Approaches*

Rather than presenting learning skills as a list of 'tips' or a series of 'do's and don'ts' it is useful to investigate reasons why certain strategies work or do not work. This often means asking students about their rationale for the strategy they use to see how it can be adapted, rather than replaced.

An example is students' use of highlighting while reading texts. Rather than telling them not to highlight on first reading, ask them what they are trying to achieve in that initial reading. If their goal is understanding, then it is too early to be making judgements about what is important until a complete section (this need only be a page or so) has been covered. At this point highlighting might be very useful, while rereading, to select what is important to remember.

There are several inventories throughout the book which are designed to help with a student's personal assessment. Again these can be adapted for your students.

4. *A Variety of Examples for Practice*

Creative use of small group discussion on different ways to apply a strategy will help to establish the idea more clearly in the repertoire of the student. The applications should not involve too much complexity at the outset since it appears to take considerable practice to learn how to apply a strategy in just one setting. Even after it has been established, the ways in which students generalize a strategy across tasks may vary tremendously.

5. *Modelling Learning Behaviour*

One challenge of this process of teaching learning skills is that often you, as the instructor, have to reconsider your own learning style and strategy. Being able to model yourself as a learner to students, both in terms of how you do things efficiently as well as what you have difficulty with, can affect your students' willingness to persist. They will then be sharing in the excitement of finding more successful ways to learn.

6. *Evaluation*

In order to encourage students to become more aware of monitoring how and when to use strategies, accurate feedback about what is successful is very important. Rewards may be fairly long term in the case of specific strategies — for example a student who regularly reviews class notes over a whole year may very well find a positive improvement in the final course grade. However unless some interim benefits are recognized by the student this useful strategy may not be consistently applied.

Sample Worksheet 1

Personality Influences in Time Management

Most of us enjoy advantages and suffer disadvantages as a result of our choices about how to spend time on certain tasks. Can you identify some of these advantages and disadvantages in each of the following cases?

	Advantages	*Disadvantages*
1. Joe accomplishes study tasks systematically. He does not take short cuts and makes decisions slowly		
2. Sharon hurries through most assignments. She may miss details but can do a lot in a short time.		
3. Jim is very painstaking and never needs to redo assignments. He often overplans and fails to meet deadlines.		
4. Jennifer helps others, often in preference to completing her own work. She consults others frequently before getting down "to it".		
5. Now, describe and assess your style in the same way.		

Sample Worksheet 2

PROBLEMS CONCENTRATING?

1. Tom is in residence and he finds that there are always interesting activities going on. This tends to distract him when he tries to settle down to work. ***How can he sort out this problem?***

2. Janice wants to get into the Business School so she settles down to work every evening after supper. She finds that she gets very fidgety after an hour. ***How can she change this?***

3. When Mike reads his sociology text he soon finds himself daydreaming. ***What suggestions can you make?***

4. Patty has two brothers and a sister who all went to university, got degrees and have good jobs. Everyone assumes Patty will do the same. She doesn't want to disappoint them but finds it really difficult to concentrate on studying. ***What kinds of things ought she to check out?***

END

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